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As a final chapter in the research to evaluate the impact of the Michigan township extension experiment, this report focuses on why and how change came about, what factors appear to be most closely related to change, and the ways in which change agents can most effectively help bring about change. In the experiment, extension agents worked intensively with farm families in five township areas for five years; one of the major objectives was to develop and test techniques for increasing agricultural output. It was found that farmers in experimental areas adopted improved farm practices faster and stepped up their use of inputs more than farmers in matched control groups. Average value of total farm output increased $5,600 on experimental farms as compared to $3,400 on control farms. Net farm earnings for the experimental sample increased an average of $1,646 as compared with $938 for the control sample. Benefit-cost analysis showed that the program cost $117 per farm per year. The differential increase in net earnings during the five-year experimental period exceeded the total costs of the program by two and one-half times. (Included are 32 tables, 14 references, and a model of relationship among types of variables studied.) (eb)

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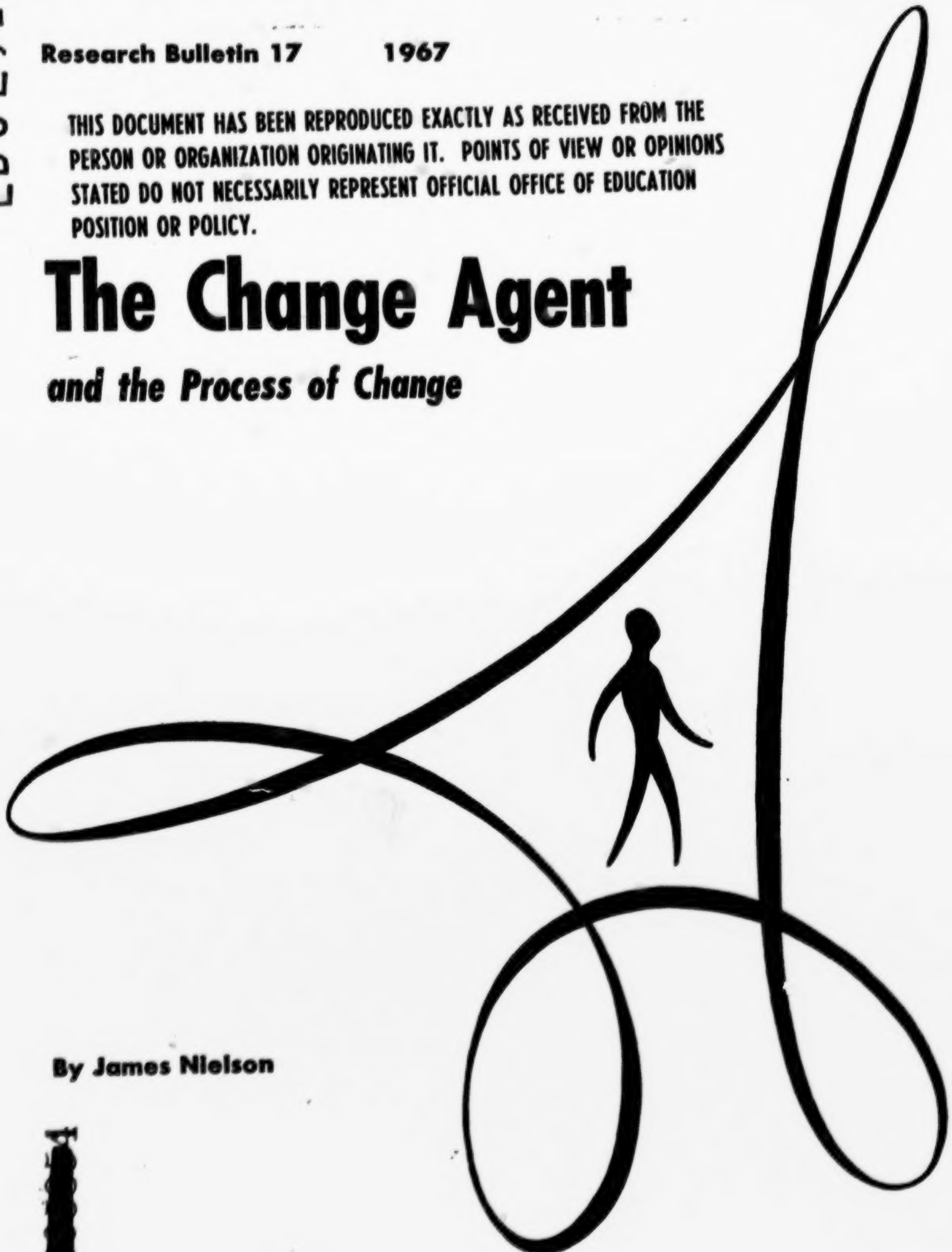
The Change Agent

and the Process of Change



By James Nielson

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MICHIGAN STATE UNIVERSITY
Agricultural Experiment Station
East Lansing, Michigan

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SUMMARY AND PERSPECTIVE

With rapidly expanding population around the world, agricultural leaders are giving increased attention to possibilities for increasing world food production. One such possibility is by leading farmers to adopt the best-known technology through educational programs such as those conducted by the Agricultural Extension Service in the United States.

The Michigan township extension experiment provided an opportunity to study the process of change in farmers, on farms and in rural communities. In the experiment, extension agents worked intensively with farm families in five township areas for five years. This is the final chapter in the research to evaluate the impact of the experiment.

In this report, attention is focused on why and how change came about in response to the experimental program, what factors appear to be most closely related to change, and the ways in which change agents can most effectively help bring about change. An attempt is made to point up what was learned in the experiment that could be helpful in organizing, financing and conducting intensive educational programs with farmers.

One of the major objectives of the experiment was to develop and test techniques for increasing agricultural output. The research indicated that farmers in the experimental areas adopted improved farm practices at a faster rate and stepped up their use of inputs more than farmers in matched control groups. Average value of total farm output increased $5,600 on experimental farms as compared to an increase of $3,400 on control farms.

Net farm earnings for the total experimental sample increased an average of $1,646 as compared to an increase of $938 for the total control sample. The benefit-cost analysis reported in this bulletin shows that the program cost $117 per farm per year. The differential increase in net earnings during the five-year experimental period exceeded the total costs of the program by two and one-half times.

Evaluation and interpretation of an experimental educational program requires a comprehensive description of the program. The major elements of the extension program in the experimental areas are described in Nielson (10). In effect, this report comprised a statement of the experimental extension "treatment" as compared to a county extension program.

Changes in farm earnings, net worth, farm inputs and output, efficiency of production, and farm practices in experimental as compared to control samples of farmers are reported in Nielson and Crosswhite (12). Nielson (11) concentrated on farmers' attitudes, goals and goal achievement, including changes in level of living.

Acknowledgments

In this final report, I want to again record my very substantial debt to the township agents, to the county extension agents in the counties where the experimental and control groups were located, and to the nearly 400 farmers who cooperated in the research.

I worked closely with, and received valuable help from, E. O. Moe, formerly of the Department of Sociology and Anthropology at MSU and now Director of the Institute of Community Development at the University of Utah, on the parts of the research related to changes in people and communities.

Material for one section of the present report was drawn from Howard Latimer's Master's thesis. Other former graduate students who provided assistance at various stages in the research were R. F. Bittner, Frank Madaski, Carl Eicher, Myron Wirth, Harold Carter, Wilmot McDowell, James Goering, William Crosswhite, and Ross Bolger.

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THE CHANGE AGENT AND THE PROCESS OF CHANGE

A Study of an Experimental Agricultural Extension Program

By JAMES NIELSON[1]

INTRODUCTION

As we entered the decade of the 1950's, agriculturists in general and extension workers in particular were troubled by the direction that agricultural extension work had taken in the United States. The large number of farmers per agricultural agent, the heavy demands on agents' time for work with organizations, emphasis on the use of mass media, and the infrequency of agents' visits to farms were all cited as important problems facing extension.

Among other things, these concerns resulted in increased Federal appropriations to be used in the states for farm and home development work starting in 1954-5. In Michigan, concern over these problems led, in addition to increased emphasis on farm and home development, to the establishment of the township extension experiment.

The experiment provided a testing ground for determining the impact of an intensive application of extension resources; it offered an opportunity to compare the differential impact of an intensive township extension effort with the traditional county extension program.

Objectives of the Experiment

The primary objectives of the experiment were to determine the effect a program of extension education would have on:

1. Increasing agricultural output,
2. Increasing farm earnings,
3. Speeding up the application of improved agricultural practices,

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[1] Formerly professor, Department of Agricultural Economics, Michigan State University; now professor and chairman, Department of Agricultural Economics, Washington State University.

4. Bringing about higher levels of living for farm families, and
5. Accomplishing improvement in rural communities.

Secondary objectives of the experiment included: (1) to experiment with systems of financing extension work, particularly in obtaining more financial support from the local level; (2) to gain insights on organizing intensive extension programs; (3) to experiment with extension techniques for conducting educational programs on an intensive basis with farmers; and (4) to evaluate the attitudes of farmers and agents toward such an intensive program.

The Experimental Program

Geographical distribution, representation of several of the state's major farm types, and willingness of local farmers to bear part of the cost of the program were the important considerations in selecting the areas for the experiment.

Organization and Financing

The work in the townships was directed by the Michigan Cooperative Extension Service, with the assistance of local farmers. The research was conducted by the Michigan Agricultural Experiment Station. The W. K. Kellogg Foundation provided a grant which covered an important part of the financing for both the extension operation and the associated research.

At the beginning of the experiment, a full-time program coordinator was appointed to organize and direct the program in the five areas. About a year after the program was launched, he was appointed state leader of agricultural programs and later was advanced to the position of assistant extension director. After receiving these appointments, he spent considerably less time on the township program. At the request of the township agents, a farm management extension specialist was assigned to work with the agents part-time about a year and a half after the program started. He provided subject matter help as well as some program guidance.

An extension association was formed in each of the township areas at the beginning of the experiment and members elected boards of directors at their annual meetings. These boards played an active role in developing programs, arranging local financing and assisting the township agents in carrying out certain phases of the extension programs.

The grant from the Kellogg Foundation was supplemented from the state extension budget to finance the experiment. Additional financial support for the program was sought at the township level. The original design was for the townships to provide financial support for the program. However, it was discovered that townships could not legally use funds to support extension work. Consequently, in four of the experimental areas local finances to support the program were obtained through voluntary annual contributions from farmers and local businessmen. In the Newton area an extension association was formed, and farmers who joined the association paid annual fees based on acreage operated.

In four of the experimental areas, the township program was available to all farm families in the area. In the Newton area the program was available only to the farmers who joined the extension association; a membership of around 50 was maintained in the Newton association. During the five-year experimental period the average number of farm units with a substantial farming operation ranged from 50 to 172 and averaged 113 in the five areas served by the township agents. Thus, in terms of farmers per agricultural agent, the township program was about 10 times as intensive as the normal county agricultural extension program in Michigan.

The Operating Program

All of the agents considered it their major responsibility to work with farm operators who carried on substantial farming operations. Their programs were almost entirely agriculturally oriented.

In conceiving the township experiment, the extension administrative staff envisioned a program that would follow the lines of a traditional county agricultural extension program except that it would be applied on a much more intensive basis (i.e., fewer farmers assigned per agent). During the first two years, all five of the township agents conducted programs which were essentially intensifications of the county approach.

One striking difference between the township program and the typical county extension program emerged almost immediately—namely the extent to which the agents worked with individual farmers. All of the township agents built their programs around contacts with individual farmers, primarily through farm visits. The agents typically spent three-fourths of their time in the field and averaged around 65 farm visits per month, or 800 per year. During the five-year period the township agents made an average of seven farm and home visits per year to each farm in the township where substantial farming operations were conducted. As the program progressed and the township agents became more involved with the farmers, the number of visits generally declined and the amount of time spent per farm visit increased. During the latter half of the program, many of the farm visits were three to four hours or longer.

The township agents reinforced their individual contact work with the use of demonstrations (such as fertilizer, crop variety, tillage, and weed control), the mass media, and to a lesser extent with group events.

As compared to county agricultural agents, the township agents made greater use of personal contact activities, held fewer group meetings, and made less use of the mass media. To the extent that group meetings were held, they were largely conducted in series such as in farm and home planning groups.

The township agents spent a larger percentage of their time on work related to crops, soils, and soil and water conservation than any other subject matter area. Much of this work was concentrated in the first two years of the program, although during the summer months all of the agents spent considerable time on crop and soil work throughout the five years. The township agents placed considerable emphasis on planning and construction of farm buildings, record keeping, income and social security taxes and marketing and outlook information. They spent some time working with organizations and community groups, but spent far less time working with organizations than the typical Michigan county extension agent.

Starting in the third year of the program, more emphasis was placed on farm analysis and planning. Individual farm analysis became an important part of the program in all five areas during the last three years, especially in the Newton and Odessa areas. Three of the agents also organized and worked with farm and home planning groups. Their interest in this work resulted in part from a feeling of inadequacy regarding their initial approach; this interest was augmented by the work of the farm management specialist. The trend toward emphasis on farm analysis and planning on the part of the township agents appears especially noteworthy in light of the fact that the experiment was not designed as a farm and home development program.

The Research

The main objectives of the research on the township experiment were to determine what happened by virtue of an agent working closely with a limited number of farmers for five years, and to provide interpretive or explanatory information on why and how changes did or did not come about in response to the experiment.

Data for the research were obtained from two sources—extension personnel and farmers. The township agents were interviewed periodically throughout the five-year experimental period. The program coordinator and the county extension agents in the counties where the experimental areas were located were interviewed on several occasions. Some information was obtained from monthly and annual reports of the extension agents in the experimental and control areas.

Samples of about 40 farms, representative of the dominant farm type in the area, were drawn in each of the experimental areas at the beginning of the experiment. Benchmark surveys were made early in 1954 (obtaining 1953 data). An intermediate survey was made in 1956 (1955 data) and a terminal survey in 1959 (1958 data). Farmers in the experimental samples ran the gamut from those who were enthusiastic participators in the program to lukewarm participators to nonparticipators.

In order to isolate the effects of the program as much as possible, the experimental design consisted of selecting a control sample to match each of the experimental samples on characteristics which seemed likely to affect the impact of the program. Essentially the same benchmark, intermediate and terminal information was obtained from the farmers in the control as in the experimental samples. Statistical tests were applied to determine how well the farm operators, families, and farming units in the control samples matched the experimental samples. These tests revealed few differences between experimental and control samples on variables which seemed likely to affect the outcome of the township program.

Only the farm survey data from farmers who remained in the samples through the terminal survey were used in this research. The changes reported, therefore, could not result from changes in the composition of the samples.[2]

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[2] Sampling procedures, selection of the control groups, amount and reasons for attrition from the samples and related information were outlined in Technical Bulletin 274 (12). Description of the areas and characteristics of the samples are provided in detail in Technical Bulletin 287 (11). For the reader's convenience in interpreting the farm survey data in this report, the sample sizes are repeated here.

	Newton	Tri-Twp.	Denmark	Almont	Odessa	Total
Experimental	26	20	36	28	38	148
Control samples	27	28	37	37	34	163

Farmers in the control samples had access to county extension services but not to the experimental program during the five-year experimental period. The research focuses attention not only on change from the benchmark to the terminal period (1953 to 1958), but more particularly on the differential change between experimental and control.

ACCOMPLISHMENTS IN RELATION TO THE MAJOR PROGRAM OBJECTIVES

Accomplishments in relation to the five major program objectives are outlined below. Progress in the attainment of the first four objectives is presented in summary form since information on them was presented in previous reports. Progress on the fifth objective—bringing about improvement in rural communities—is presented in greater detail since it was not reported previously. Conclusions in relation to the four secondary objectives of the experiment are presented in the last major section of this report.

Objective 1: To Increase Agricultural Output on the Farms in the Townships

Administrators who instigated the township program considered it an important part of the experiment to develop and test techniques for increasing total agricultural output. While they recognized that there was not an immediate need for increased output, they believed that the "know-how" for increasing production was an important national asset in case it became necessary to increase food production rapidly to meet emergencies that might arise in the future.

For the most part, the township agents did not direct their programs at increasing production as an end in itself. However, in analyzing individual farm businesses, they concluded that the volume of business was inadequate on some farms. In these cases they encouraged the farm families to expand production as a means of increasing net farm earnings.

The differential increase in total farm output between the total experimental and total control sample was striking:

Value of total farm production (in 1953 dollars):	1953	1958	Change
Experimental	$11,608	$17,234	+ $5,626
Control	10,472	13,846	+ 3,374
Differential between experimental and control			+ 2,252

The biggest differential increases in output between experimental and control samples were in the production of grain and beans (an average increase of 23.1 tons per farm for the experimental farms as compared to an average increase of 13.8 tons for control farms), hay and hay equivalent (+34.6 tons vs. +5.6), milk (+516 cwt. vs. +320 cwt.), and hogs (+24 cwt. vs. −1).

Objective 2: To Increase Farm Earnings

Increasing farm earnings was the objective stressed most by the program originators; it was also the objective emphasized most in promoting the program in the townships prior to establishing the program. The township agents put considerable emphasis on helping farm families make changes that were expected to directly or indirectly lead to increases in net farm earnings.

Experimental farmers made significantly more progress than control farmers in increasing their net farm earnings during the five-year experimental period as shown:

Net farm earnings	1953	1958	Change
Experimental	$ 4,481	$ 6,127	+ $1,646
Control	3,995	4,933	+ 938
Differential between experimental and control			+ 708

Nonfarm receipts, mostly from work off the farm, increased more on control than on experimental farms, primarily because control farmers put more emphasis on nonfarm work as a source of income. Changes in nonfarm receipts are summarized:

Nonfarm receipts	1953	1958	Change
Experimental	$ 778	$ 1,558	+ $ 780
Control	765	1,771	+ 1,006
Differential between experimental and control			− 226

There was a tendency for farmers in experimental areas, faced with unsatisfactory earnings in agriculture, to either get out of farming entirely or to strive harder to make a go of it in farming. Control farmers, on the other hand, were more apt to adjust their goals downward, hang on and make the best of it, or to seek a part-time job off the farm. Part of the differential reactions between experimental and control farmers is attributable to the township program.

The township program appears to have contributed to the greater satisfaction of many farmers who remained in farming by helping them adopt improved practices and improved farm organizations. The higher yields, better livestock, and generally more productive farm units gave farmers a sense of satisfaction of doing a better job of farming (as well as contributing to increased farm earnings). The township agents also helped build farmers' morale, provided encouragement, helped instill confidence, and helped develop a sense of pride in farming as an occupation.

Objective 3: To Speed up the Application of Improved Agricultural Practices

Cutting the lag between the time research on improved production techniques is completed and the time the results are put to use by farmers was one of the main objectives of the township experiment.

The township agents initiated their programs primarily by working on farm practices, and placed considerable emphasis on them throughout the five-year experiment. Adoption of improved practices was considered not so much as an end in itself, but rather as one possible way of increasing farm earnings or bringing about higher levels of living. Certain practices were especially recommended by the township agents because they would make farming easier.

Farmers in the experimental samples adopted recommended soil and crop practices at a dramatically faster pace than control farmers during the experimental period. For the sample as a whole, there was only slight differential in favor of the experimental farmers as compared to control in the adoption of livestock and poultry practices.

Changes in individual farm practices for the total experimental and total control samples were reported in Technical Bulletin 274. Following publication of that report, weighted practice adoption scores were computed for each farm. Average practice adoption scores for 1953, 1958, and change from 1953 to 1958 are given for each experimental and control sample and for the total experimental and total control samples in Appendix Table 1. The table includes subscores for soil management and fertilization practices, crop culture practices, corn practices, dairy practices, hog practices, new farm practices, and a total farm practice adoption score.

Changes in the total practice adoption score for the total experimental and total control samples were:

Total farm practice adoption score	**1953**	**1958**	**Change**
Experimental	42	59	+17
Control	40	49	+ 9
Differential between experimental and control			+ 8

Objective 4: To Bring About Higher Levels of Living for Farm Families

The activities of the township agents centered primarily on farm production. All of the township agents conducted extension programs which emphasized building up more productive farm units that would produce higher net earnings. The agents believed that helping farm families improve their incomes and, in some cases, helping them adopt labor-saving equipment and methods would contribute to a better living on the farm. For the most part they did not consider it their role to help farm families allocate their income between production and consumption, nor to assist the families in planning their consumption expenditures so as to make best use of the income which was allocated to the home and family living.

Information was obtained on farm families' progress in obtaining 12 material possessions which are commonly included in farm level of living indexes and which could contribute to a better living on the farm. There were modestly greater increases from the benchmark to the terminal year in the total experimental sample than in the control in the percentage of families possessing pianos, high-fidelity phonographs, vacuum cleaners, central heating systems, automatic washers and clothes dryers. Average material possessions scores changed as follows:

Material possessions score	1953	1958	Change
Experimental	6.27	7.99	+1.72
Control	5.88	7.47	+1.59
Differential between experimental and control			+ .13

Objective 5: To Bring About Improvements in Rural Communities

While bringing about improvement in rural communities was one of the objectives of the township experiment, the township agents carried out programs which were oriented primarily toward assisting individual farm families. The agents did only a limited amount of work aimed specifically at bringing about community improvement. This being the case, the research objectives in connection with community improvement centered on attempting to observe the impact of the limited amount of direct activities conducted by the agents, and recording evidence of indirect impacts of the program on the communities.

One of the most substantial and tangible contributions the township program made to the communities was in building up the economic base of the communities. This is partly evidenced in the greater increase in farm assets and net worth of farm families in the experimental as compared to the control areas. It is evidenced in an important respect through the increased farm earnings. Much of the increased earnings were spent in the local communities, thus benefiting the local businessmen. The increased net worth and earnings provide a broader base for supporting community institutions and services.

A second way in which the township agents helped bring about improvements in the communities was through the development of more effective farm leadership. The agents reported that, due to their close relationships with farmers, more opportunities were provided for developing farm leadership in the township program than in a county extension program.

Perhaps the most noteworthy examples of leadership development related to farmers serving on the township extension boards of directors. These farmers accepted more responsibility than most of them had before. The township agents used these boards far more than county extension agents use their county extension advisory councils in Michigan. Some of the experiences that the township extension directors had which contributed to their leadership development were: a. organizing and conducting fund raising campaigns; b. planning and conducting activities and events such as annual meetings, tours and corn contests; c. speaking to farmer and urban groups; d. participating in the annual township extension conferences at the university; e. meeting with state legislators to convince them that township enabling legislation should be passed; and f. making organizational arrangements for continuing the program at the end of the experiment.

Thus, an important product—largely a by-product—of the township program was the development of farm leadership. Development of effective rural leadership can be considered an end in itself, especially considering the increasing complexity of rural society and the rapidity with which change is taking place in agriculture and rural communities.

A third contribution of the township program was bringing about increased community spirit among farm people. In a number of instances, the township agents were successful in bringing about cooperative action among the farmers in their areas. For example, the Denmark agent succeeded in getting farmers to cooperate in spraying drainage ditches for weed control. In a poorly-drained area in Almont township, the township agent encouraged farmers to organize and petition the Soil Conservation Service for a drainage survey. Then they planned and constructed a much-needed drainage system, with the costs shared among cooperating farmers.

The township extension association boards and the township agents were responsible for bringing farm people together—for association meetings, tours, picnics and other activities. The Tri-Township agent took the initiative in organizing a number of building bees. The bees made it possible for farmers in the area to have buildings that their limited capital would not otherwise have permitted, and helped build community spirit and morale. The Denmark township agent conducted a number of chicken barbecues, did the calling at square dances and carried out other activities which brought people closer together in an area in which the farm people had tended to go their own separate ways or, at most, met in small family groups.

It should be noted that some of the organizational activities connected with the township program had a divisive effect on the farm people. For example, some of the early efforts to promote the establishment of a township program at the beginning of the experiment resulted in antagonism between farmers who were for and those who were against having the township program in the area. While some of this feeling was aroused in all areas except Tri-Township, the problem was by far the most acute in the Newton area. The campaigns for, and in some cases against, continuing the program at the end of the five-year experimental period also had some destructive effects on the communities in Almont, Denmark and Odessa.

In total, the positive influences of the township program on relationships among farm people outweighed the negative. On the terminal survey a number of farmers in all experimental areas said that one of the important contributions of the township program was to bring farm people closer together and to promote a spirit of unity and cooperation.

A fourth contribution of the program was to bring about better understanding between rural and town people in the townships. The Odessa and Almont agents conducted activities which were designed specifically to foster better relationships between the rural and urban people. For example, the Odessa agent and township extension association board took the lead in organizing a rural-urban day which was started during the second year and which was continued throughout the rest of the experimental period.

The purpose of the rural-urban day was to create harmony between farm and urban groups and to foster better mutual understanding of each other's problems. A number of people were involved in committee work in connection with this event. For example, during the first year 37 people representing 9 rural and urban organizations served on 7 different committees to plan, publicize, and conduct the event. The rural-urban days were held in the central town in the township. The main ingredients were a noon luncheon, speeches, entertainment and programs on special-interest subjects that would appeal to both farm and town people. Attendance at these events ran from 500 to 800.

In interviews with research personnel, a number of farmers expressed the belief that the township program had brought about better relationships between rural and urban people. They pointed out that activities sponsored by the township associations had helped farmers appreciate the costs and problems of the merchants, and helped townspeople understand the problems faced by farmers.

BENEFIT-COST ANALYSIS[3]

Although education is certainly a form of resource investment, namely an investment in the human resource (13), little effort has been made at analyzing educational programs in benefit-cost terms. Probably the main reason that few benefit-cost type analyses have been made in extension is the extreme difficulty of measuring the results of extension educational programs, including such subproblems as determining who has benefited from extension activities. A second set of difficulties relates to estimating costs, and particularly of allocating costs among the numerous extension programs and projects that are operating simultaneously.

As part of the overall evaluation of the township experiment, benefit-cost analysis was conducted. The procedures used in this analysis were adapted from analyses commonly used by governmental agencies in evaluating resource development projects. In the case of the township program, the benefit-cost analysis provides a partial accounting of results in terms that can be compared with the financial support given to the program in returns per dollar spent.

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[3] Much of the material in this section is based on the following items in the Literature Cited section: (5, 7 and 8).

Benefits

Benefits During the Experimental Period

For the purpose of the benefit-cost analysis, differential increase in net farm earnings between experimental and control farmers was taken as the measure of benefits.

Net farm earnings figures were available for experimental and control farms for the benchmark and terminal years of the experiment, which showed $708 more increase on experimental than on control farms during the experiment. In order to estimate the cumulative benefits in terms of net earnings during the experimental period, it was necessary to estimate the pattern of annual increase in net farm earnings during the five-year period.

Annual farm earnings were obtained and studied on farms in the experimental and control samples who participated in the MSU farm account project throughout the experimental period. This sampling indicated that, on the average, net earnings on control farms increased roughly on a straight line from 1953 to 1958, whereas earnings on experimental farms followed an S shaped growth curve. This information was used in estimating the rates at which earnings changed on the average experimental and the average control farm.

Comparing the earnings curves for the experimental and the control groups for the five years indicatd the differentials shown below in favor of the experimental sample.

Year	Differential net earnings between experimental and control
1954	—$ 100
1955	0
1956	+ 350
1957	+ 600
1958	+ 708
Total	$1,558

The cumulative total of $1,558 provides an estimate of primary project benefits in terms of benefits per farm during the experimental period. If it had been assumed that earnings on experimental as well as control farms had increased along a straight line, the cumulative benefits, and the resulting benefit-cost ratios, would have been higher.

In order to determine the magnitude of the total five-year primary project benefits, it was necessary to estimate how many farms benefited from the township program. In Newton township, a paid township extension association membership of approximately 50 farm families was maintained throughout the experiment; even though 100 different families were members of the association at one time or another during the experiment, it was assumed that benefits accrued to only 50 families.

In the other four township areas, the township agents were available to anyone who sought their assistance. It was assumed that the program contributed to increased earnings only on farm units with most of the income from farming; i.e., no benefits accrued to small and part-time farmers who earned more than half their income from off-farm sources. The number of such farm units in the beginning and ending years of the experiment were obtained, and it was assumed that the number decreased at a constant rate during the experiment.

The average beginning and ending numbers of farm units were obtained for the four areas which were added to the 50 from Newton to give a total of 567. It was assumed that only one family per farm unit would benefit from the program, even though more than one family was involved in operating a number of the farms in the townships. It was also assumed that the differential increase in net farm earnings on sample farms was representative of the increase on all of the farm units with most of their income from farming.

Multiplying the estimated cumulative benefits of $1,558 per farm times the 567 farms produced estimated total primary project benefits of $883,386. Average annual primary project benefits were $176,677, and average annual primary project benefits per farm were $312.

In benefit-cost and similar analyses, the usual procedure is to measure benefits in terms of constant purchasing power to take account of changes in economic conditions and price levels. Estimated net farm earnings were adjusted to a 1953 equivalent base by using the USDA Index of Prices Paid by Farmers for Family Living Items. This adjustment reduced benefits per farm to $1,484, total primary project benefits to $841,428, average annual project benefits to $168,286, and average annual project benefits per farm to $297.

Projected Benefits

Expenditures on the township program were a form of capital investment—an investment in people through an educational program. Education is somewhat durable, even though part of what is learned becomes obsolete in time. It can be expected that farmers in the experimental areas will continue to use part of what they learned through the township program as long as they are in farming. The investment in the township program must be considered as a capital investment that has a continuing return over time. Thus, an attempt was made to estimate the continuing benefits of the program.

In estimating the magnitude of future benefits, it was noted that the average age of the farm operators in the experimental sample at the end of the experiment was 48 years. It was estimated that on the average the benefits of the program would extend over a period of 12 years following the end of the experiment, and that by the end of 12 years all of the farm operators involved would have retired from farming or if farming, the program would have no further impact on their earnings beyond that point. It was further estimated that one-twelfth of the farmers in the experimental areas would retire from farming in each of the 12 years following the end of the experiment.

It was assumed that the margin of net earnings advantage would decline over time—because of the obsolescence of technical knowledge and lack of on-the-spot encouragement and guidance from the township agents.

The future benefits of the program were expressed in terms of 1953 purchasing power (the $708 differential deflated to $662). It was assumed that by the sixth year following the end of the experiment the discounted differential earnings advantage would drop to $100 per farm per year and remain at that level for the remainder of the 12-year period. The annual primary project benefits per farm were estimated as follows for the years following the end of the experiment:

First year	$662
Second year	589
Third year	465
Fourth year	312
Fifth year	162
Sixth year	100
|	|
Twelfth year	100

The annual benefits per farm, above, were multiplied by the estimated number of operators left in farming in each of the 12 years following the experiment. The projected benefits resulting from the township program was thus estimated to total $1,128,538. Considering the decline in the margin of advantage per farm and the decline in number of farms per year, most of the projected benefits would accrue in the early part of the 12-year period. For example, over one-half of the total would accrue in two years following the end of the experiment, nearly three-fourths in three years, and 85 percent in four years.

Discounting Future Earnings

Most benefit-cost analyses assume that the goal to be sought in selecting projects is the maximization of the present value of future net benefits. A discount rate is used in estimating the present value of future benefits. The discount rate is designed to take account of (a) changes in purchasing power of earnings over time, (b) time preferences for earnings, and (c) allowances for risk.

The common practice in analyzing public programs is to use an interest or discount rate between 2 and 4 percent, depending upon the expected yield rate on long term government bonds. A rate of 3.5 percent was used in the present analysis.

The present value of the estimated primary project benefits during the projected 12 years totaled $1,025,048. The average annual primary project benefits were $85,421.

Discounted benefits for the five-year experimental period ($841,428) plus discounted benefits for the 12-year projected period ($1,025,048) totaled $1,866,476.

Costs

Costs During the Experimental Period

The township experiment was administered in a manner which facilitated computation of costs. A large part of the funds for the program were contributed by the Kellogg Foundation; the state extension office disbursed the funds and gave a detailed accounting of expenses in annual reports to the Foundation. Early in the experiment, the researchers set up procedures to record or to estimate costs not covered in the Kellogg grant.

The costs of the township program were summarized into six groups as outlined below. This grouping should permit comparisons with the costs of other types of extension programs, or even with other types of educational programs.

Township field staff—Costs of providing the township field staff included township agent and clerical salaries (excluding retirement contributions); travel expenses; office supplies; rentals; and communication costs.

Administration and coordination—Administration and coordination costs included salaries for the proportion of the time that the project coordinator and the farm management specialist assigned to the program spent on the program, secretarial salaries allocated to the program, travel expenses, office supplies, rentals, communication costs, and the costs of the annual township conferences on the university campus. While the farm management specialist provided subject matter help in farm management to the agents as well as assisting them in program development, it seemed more appropriate to include his costs under administration and coordination than under specialist help. In allocating the administration and coordination costs among townships, all costs except the salary of the farm management specialist were allocated equally among the five township areas. The salary cost of the farm management specialist was allocated to each of the township areas on the basis of proportion of the time he spent in each township each year.

Specialist help—Items included in computing the cost of specialist help were salaries (excluding retirement) of state extension, research, and teaching staff who provided specialist help to the township agents; meals and lodging; travel mileage reimbursements; value of estimated time spent enroute to the townships; and value of estimated time spent in preparation for township visits.

The list of days spent by each specialist in each township provided by the township agents and including time in the townships and estimated travel and preparation time was turned over to budget officers of the College of Agriculture. They in turn computed the total salaries by townships by years, using actual salary figures. Meals were estimated using a cost of $4.50 per full day and $3.00 per half day of specialist time in the field. Lodging, at a rate of $5.00 per night was figured on overnight trips. Mileage, at a 7 cents per mile rate, was figured on the estimated proportion of the specialist man-trips to the townships that were made alone by one specialist in a car.

Retirement—Retirement contributions of 5 percent of gross salaries were computed and allocated among the townships in the same manner that the salaries were allocated.

Special Materials—Early in the township program, the Soils Department at MSU and the Soil Conservation Service conducted detailed soil surveys in the five township areas. The total costs of printing the township soil inventory reports for four townships were charged to the township program, because normally the soil inventory reports are published by counties only. The report for Almont township was not published.

Equipment depreciation—Each township was provided a $1,000 equipment allowance at the beginning of the experiment. Depreciation on equipment was charged against the program using a rate of 10 percent per year (straight line method).

Costs of the evaluation research were not charged against the program. The number of farms used in computing the program costs per farm is the same as used in computing total benefits per farm.

TABLE 1. Cost of the Michigan township extension program, five-year experimental period.

Cost grouping	Newton	Tri-Twp.	Denmark	Almont	Odessa	Total
Township field staff	$50,350	$55,551	$43,182	$47,283	$53,036	$249,036
Administration and coordination	9,785	8,318	7,795	8,867	9,002	43,767
Specialist help	1,943	11,359	2,903	1,514	2,074	19,793
Retirement	2,222	2,491	1,828	2,064	2,236	10,841
Special materials	1,486	1,382	545	–	1,434	4,847
Equipment depreciation	157	515	307	326	458	1,763
TOTAL COST	65,943	79,616	56,561	60,054	68,240	330,414
Average annual cost	13,189	15,923	11,312	12,011	13,648	66,083
Total cost per farm	1,319	1,048	329	484	471	583
Average annual cost per farm	264	210	66	97	94	117

Table 1 gives costs according to the six cost groupings used above, the total and average annual costs for each experimental area, and the total and average annual cost per farm by experimental area for the entire program. Differences in costs among townships primarily reflect differences in the salaries of the township agents and differences in amounts of specialist help used. Differences in cost per farm are strongly influenced by the number of farmers served by each township agent.

In general the cost of maintaining a county extension agent and a township extension agent would be similar. The costs of the Michigan township program were higher for several reasons, including costs of establishing the program and higher salaries needed to attract experienced agents.

Even though interest costs were not involved in obtaining the use of the $330,000 involved in conducting the program, some would argue that interest on investment should be charged against the program. The interest would represent the cost of diverting the funds away from alternative uses. To make the analysis complete, interest on the investment in the township program was computed. A rate of 3 percent was used (based on the average yield of 12-15 year taxable U. S. government bonds during the experimental period). In computing interest on the investment in the program, it was assumed that one-twelfth of each year's cost was incurred in each month of the year. Interest was figured on costs for each of the 60 months for the time remaining to the end of the experiment.

Cumulative interest costs totaled $26,168 for the five areas. Adding these interest costs to previous costs produced the following results:

Total cost	$356,582
Average annual cost	71,316
Total cost per farm	629
Average annual cost per farm	126

As in the case of the benefits, the costs of the program were adjusted to express them in constant purchasing power. The Consumer Price Index computed by the U. S. Department of Labor was used to adjust the operating costs of the township program to a 1953 equivalent basis. Adjustments were made in the costs for each year of the program, using the CPI index for that year, and the annual adjusted costs summed to obtain total adjusted costs:

Total cost	$348,883
Average annual cost	69,778
Total cost per farm	615
Average annual cost per farm	123

Projected Costs

In the previous section, benefits from the program were projected for 12 years following the end of the experiment. Since expenditures on the program were considered a capital investment, interest on this investment can be considered a continuing cost. It was assumed that the investment would be entirely depleted by the end of the 12-year projected period.

While the yield on long-term U. S. bonds averaged 3.03 percent during the experimental period, the rate was gradually moving upward late in the experiment. A projected rate of 3.5 percent (the same rate used in discounting the benefits) was used in figuring projected interest costs.

Starting from total adjusted costs in the first year following the end of the program, interest was computed on the remaining balance each year. The interest charges for each year were then discounted (at the rate of 3.5 percent) to obtain their present values (as of the end of the experiment). The total present value of the interest charges was $68,012, or an annual average of $5,668 for the 12-year projected period.

Discounted costs during the experimental period ($348,883) plus projected interest costs ($68,012) totaled $416,895.

Benefit-Cost Ratios

Total and annual township program benefits and costs, and benefit-cost ratios, under different bases of computation are summarized in Table 2.

Benefit-cost ratios are one form of indicator of the worthwhileness of a project. Benefit-cost ratios computed here, as well as those usually computed in benefit-cost analyses, consist of dividing total or annual primary project benefits by total or annual primary project costs, with all benefits and costs converted to a common time basis. Consequently, any benefit-cost ratio greater than 1.0 indicates that the measured benefits exceed the measured costs. In the case at hand, the objective of computing the ratios is to see whether or not the benefits in terms of increased net farm earnings from the township program equal or exceed the monetary costs of the program.

If one assumed that all of the benefits to be derived from the program accrued during the experimental period, he would be most interested in the benefit-cost ratios in the first section of Table 2. This would imply that farmers gained nothing of continuing value from an educational activity such as the township program, but would benefit only when the intensive agent was on hand to provide guidance and assistance. Under such assumption, the benefit-cost ratios indicate that the benefits of the program exceed the costs by approximately two and one-half times during the five-year experimental period.

If one assumed that farmers continue to benefit from the educational investment in the manner outlined above, benefits would exceed costs by from four and one-half to six times over the 17-year period (Table 2).

The numbers of farms needed to "break even" (i.e., to produce benefit-cost ratios of 1.0) under the various bases of computation were

TABLE 2. Summary of total and annual project benefits and costs, and benefit-cost ratios, all experimental areas

Basis of computation	Benefits Total	Benefits Annual av.	Costs Total	Costs Annual av.	B/C ratio	No. of farms needed for B/C ratio of 1.0
Five-year experimental period:						
Actual benefits, actual costs, interest on investment not included	$ 883,386	$176,677	$330,414	$ 66,083	2.67	212
Actual benefits, actual costs, interest on investment included	883,386	176,677	356,582	71,316	2.48	229
Discounted benefits, discounted costs, interest on investment not included	841,428	168,286	323,058	64,612	2.60	218
Discounted benefits, discounted costs, interest on investment not included	841,428	168,286	348,883	69,777	2.41	235
Five-year experimental period plus 12-year projected period:						
Discounted benefits, discounted costs, interest on investment not included	1,866,476	109,793	323,058	19,003	5.78	75
Discounted benefits, discounted costs, interest on investment included	1,866,476	109,793	416,895	24,523	4.48	96

determined by dividing costs by the relevant benefits per farm. The results are shown in the last column in Table 2. Assuming no benefits beyond the five-year experimental period, the cumulative benefits on 200 to 250 farms would have paid the entire cost of the program, or less than half the number actually involved. The benefits on 75 to 100 farms would have covered the costs for the entire 17-year period if benefits beyond the experimental period were included.

The benefit-cost analysis took into account only one tangible benefit of the township program—increase in net farm earnings. As indicated at various points in the research, there were other tangible, as well as some intangible, benefits which could be attributed to the program. There also may have been costs other than those measured in terms of dollars, such as farmers working harder and sacrificing leisure, recreation, and other satisfactions.

THE CHANGE PROCESS AND FACTORS RELATED TO CHANGE

The main objective of the intensive township extension experiment was to bring about change—in people, on farms, and in communities. Thus one part of the research was to determine what changes took place as a result of this educational program. Another important facet of the research was to study the change process. Answers were sought to questions such as why some farmers made much change while others made little change in response to the program, how changes came about, the order or sequence of change, what factors stimulated change, and what factors inhibited change.

Conceptual Framework for the Analysis

Figure 1 presents a schematic model showing general types of relationships among categories of variables used in studying the change process. The arrows indicate the main lines of relationships that were hypothesized.

Predispositional variables constitute the internal forces within the individual which make him predisposed to react or behave in a certain way in a given behavioral situation. Variables within this category may help explain motivation for action, or place limits on the individual's behavior. Factual beliefs, goals, attitudes and personality factors are examples of these variables. Predispositional variables used

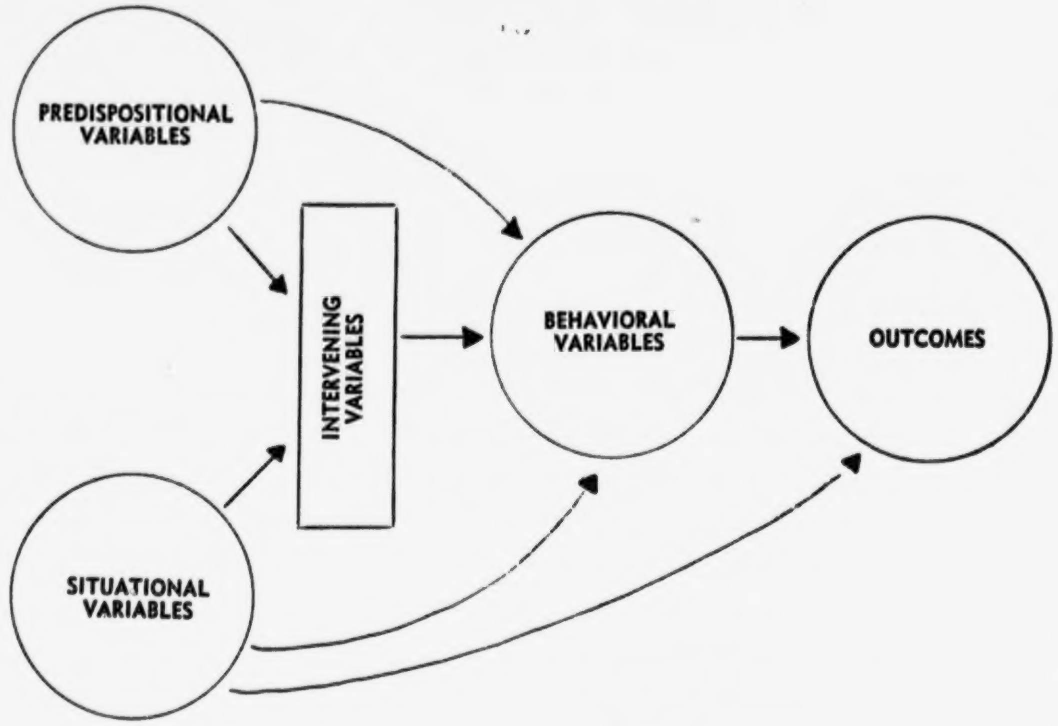

Fig. 1. Model of relationships among categories of variables studied.

in the present research are farming goals, family goals and various attitudes of the farm operators.

Situational variables are factors in the environment within which the individual lives and reacts. They suggest alternative lines of action to the individual and at the same time impose limits on his behavior. Since some variables change with time, whether they are to be treated as situational variables or behavioral variables depends upon specification of the length of run for the analysis under consideration.

The main situational variables included in the present analysis refer to the initial circumstances at the beginning of the experiment. They include (a) personal variables such as formal education of the operator, age, stage in family cycle, number of children at home, years of farming experience, etc.; and (b) farm situation, which includes many variables measuring resource and enterprise organization, tenure status, off-farm work, and measures of earnings and net worth at the begining of the experiment. These farm and personal variables were the result of all past events which had an effect on the individual and over which he had more or less control.

Another set of situational variables relevant to the study of change are the conditions which attained during the study period—such as: weather; agricultural production possibilities in the area; general economic conditions; government programs; off-farm work opportunities; and the values, goals and sanctions of the social system of which the individual is a part. Variables in this group are largely or entirely beyond the individual's control.

Intervening variables lie between predispositional and situational variables, and the resulting behavior. They may either impede or stimulate action. Many different variables could be included in this category, but in the present research attention is focused on impact of change agents. Thus various measures of extension participation were used in the analysis. Measures of formal organizational participation, a newspaper-magazine score and changes in managerial ability were also included.

Behavioral variables refer to the actions taken by the individual. Behavior may be motivated by stimuli either internal or external to the individual. Behavior results from the dynamic interaction of the various predispositional and situational forces, aided or impeded by intervening factors. Faced with the perception of a stimulus, the individual goes through a more or less conscious decision-making process in deciding what action to take, if any. There are innumerable forms of behavior. In this research, emphasis is placed on changes in farming operations such as changes in inputs, resource and enterprise organization; farm practices; and to a lesser extent, work off the farm by the farm operator.

Outcome variables refer to the results of the individual's behavior interacting with situational variables (such as weather, government programs, price conditions at buying and selling time, etc.). Outcomes desired by an individual relate to the goals which he holds at any particular time. This category includes measures of earnings. Earnings in turn can be used to obtain more ultimate goals such as level of living or build-up in net worth. Outcome variables used in the analysis include changes in yields, total farm output, net earnings, net worth, and material possessions.

Factors Related to Change in Behavioral Variables

From a much larger number of behavioral variables available, six were selected for intensive analysis on the following bases: 1.

those which were representative of related variables with which they were highly correlated, 2. those which were generally applicable to all farms in the sample, and 3. those on which enough change had taken place during the experimental period to make the analysis particularly interesting—especially where differential change between experimental and control samples appeared attributable to the experiment.

Changes in the following six variables were analyzed in detail: 1. total farm capital investment, 2. total productive man work units (PMWU), 3. total farm expenses per tillable acre, 4. soil management and fertilization practices, 5. new practices introduced during the experimental period, and 6. total farm practice adoption.

In total, many predispositional, situational and intervening variables were available for use in the analysis. On the basis of theoretical considerations, previous research evidence and judgment, 40 to 50 variables were selected that appeared relevant in explaining changes in each of the six behavioral variables analyzed.

Multiple regression analysis was employed in studying the relationships; in this analysis the behavioral variable under consideration is referred to as the dependent variable and the others as independent variables. The independent variables include some in quantified form, such as capital investment, and some in categories, such as dominant goal orientation.[4]

The effect of price changes on a number of important variables measured in dollars (such as farm output and capital investment) was controlled by deflating the change figures, i.e., expressing them in 1953 dollars since 1953 was the base year for the experiment. The deflated figures, then, provide estimates of changes due to factors other than price changes.

There were a number of differences among the five experimental areas in factors which might influence change. It was not feasible to analyze the relationships for each area individually because of the sample sizes, so data for all experimental farms were combined into one sample.

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[4] The 40 to 50 variables selected for each dependent variable were included as the independent variables in preliminary analyses. The zero-one variable approach was used for the variables in categories. Five successive regressions were run for each dependent variable before getting down to the final results reported below. After each run, the results were studied and the number of independent variables reduced by (a) eliminating variables which explained little of the variation in the dependent variable, (b) eliminating some variables which were still rather highly intercorrelated with other independent variables (generally $r = .50$ or above), and (c) combining related categories of nonquantified variables where tests showed no significant differences between the categories.

A number of variables which reflected area differences were included in the analysis and thus were studied. A variable to represent each area was included in the analyses to take account of the remaining area differences.

Relationships among variables were also analyzed for a sample consisting of all control farms. Factors related to change were similar in most respects to those in the experimental sample.

Relationships for the independent variables which were found to be most useful in explaining variation in each of the six change variables are summarized in Tables 3 to 8 for the total experimental sample. Average amounts of the dependent variables and of the independent variables that were in quantified form are provided in the tables.[5] To provide indications of the importance of the various explanatory variables, estimates are presented on changes in the dependent variables which are associated with specified increases in the independent variables, such as $1,000 increase in beginning capital level, $100 increase in net income or one point increase in participation scores.[6] For the variables in categories word descriptions are provided showing differences among the categories within an item in their relationship to the dependent variable.[7]

Importance of Predispositional Variables

Farming goals were closely associated with change in the behavioral variables. In general, farmers with the goal orientations of farm production, high level of living, and success or prestige made the most change and those in the goal orientation categories of security and owning a farm free of debt, average living, farming as a way of life, and those unable to verbalize goals made the least change. Farm production goals were most often associated with increases in total farm capital investment and increases in total PMWU; whereas high level of living and success or prestige goals were more often associated with practice adoption and increases in expenses per tillable acre.

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[5] Data were used from 117 cases for which observations were available for all variables to be used in the analysis. Because of the smaller number of cases and use of deflated figures, the averages for variables indicated in this section of the bulletin are different than the averages previously reported for the same variables.

[6] The estimates of the changes in the dependent variables were computed from the regression coefficients for each independent variable. These coefficients provide estimates of the change in the dependent variable for each unit of change in the independent variable, with the values of all other independent variables held constant. While the coefficients apply at any level of the independent variable, the estimates are more accurate near the averages for the independent variables.

[7] The significance level reported for each independent variable in the tables indicates how reliable the relationship is from a statistical standpoint. The significance levels are based on the test applied to the regression coefficients, with the values interpreted in a table for the relevant degrees of freedom (90 to 100 for the analyses reported here).

TABLE 3. Variables related to change in deflated total farm capital investment, experimental sample.

Variable	Average	Change in capital investment associated with specified change in independent variable		
		Increase in independent variable	Change in capital investment	Significance level
Dependent:				
Change in deflated total farm capital investment	$ 9,237			
Independent — quantified:				
Total farm capital investment 1953	$47,225	1,000 dollars	$—330	.01
Total farm practice adoption score 1953	42	1 point	24	*
PMWU per tillable acre 1953	2.29	.1 unit	321	.20
Net farm income 1953	$ 4,561	100 dollars	118	.10
Months worked off farm 1953	1.69	.1 month	—155	.05
Change in months worked off farm 1953-58	.23	.1 month	—340	.01
Change in total farm liabilities 1953-58	$ 4,476	100 dollars	49	.01
Total extension participation score 1955-58	158	1 point	25	*
No. of school grades completed	10.8	1 grade	511	*

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	Families in postchild stage increased $9,200 more than those in postschool stage and $13,000 more than those in prechild stage.	.10
Dominant farm goal orientation	(1) Farmers with farm production orientation increased $13,000 more than those with security, average living, or farming as a way of life orientations.	.05
	(2) Farmers with farm production orientation increased $8,000 more than those with high level of living or success orientation.	.10
	(3) Farmers with high level of living or success orientations increased $5,000 more than those with security, average living, or farming as a way of life orientation.	.20
Attitude toward farming as an occupation		
Attitude toward role of science in agriculture		

*Not significant at .20 level.

TABLE 4. Variables related to change in total productive man work units, experimental sample.

Variable	Average	Change in total PMWU associated with specified change in independent variable		
		Increase in independent variable	Change in total PMWU	Significance level
Dependent:				
Change in total PMWU	49			
Independent — quantified:				
Total PMWU 1953	367	10 units	−7	.01
Total farm practice adoption score 1953	42	1 point	0	*
PMWU per tillable acre 1953	2.29	.1 unit	7	.01
Net farm income 1953	$4,561	100 dollars	2	.01
Months worked off farm 1953	1.69	.1 month	−2	.05
Change in months worked off farm 1953-58	.23	.1 month	−2	.01
Total extension participation score 1955-58	158	1 point	0	*
No. of school grades completed	10.8	1 grade	19	.05

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	Families in postchild stage increased most.	*
Dominant farm goal orientation	(1) Farm production oriented farmers increased 180 more than those average living or farming as a way of life oriented, and 160 more than those security oriented.	.01
	(2) Farm production oriented farmers increased 105 more than those high level of living or success oriented.	.05
	(3) High level of living or success oriented increased 55 more than those security oriented and 75 more than those average living or farming as a way of life oriented.	.10
Attitude toward farming as an occupation	Farmers very well or fairly well satisfied with farming increased 20 to 90 more than those indifferent to not satisfied.	.10
Attitude toward role of science in agriculture	Farmers rating agricultural research very important increased 32 more than those rating it not important.	*

*Not significant at .20 level.

TABLE 5. Variables related to change in total farm expenses per tillable acre, experimental sample.

Variable	Average	Change in expense per T.A. associated with specified change in independent variable		
		Increase in independent variable	Change in expenses per T.A.	Significance level
Dependent:				
Change in total farm expense per T.A.	$ 13.93			
Independent — quantified:				
Total farm expenses per T.A. 1953	$ 44.12	1 dollar	$—.60	.01
Total farm capital investment 1953	$47,225	1,000 dollars	.17	.20
Total farm practice adoption score 1953	42	1 point	.33	.20
PMWU per tillable acre 1953	2.29	.1 unit	1.38	.01
Net farm income 1953	$ 4,561	100 dollars	0	*
Months worked off farm 1953	1.69	.1 month	.21	.05
Change in months worked off farm 1953-58	.23	.1 month	.02	*
Total extension participation score 1955-58	158	1 point	.06	*
No. of school grades completed	10.8	1 grade	—1.47	*

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	(1) Families in prechild stage increased about $28 more than those in preschool, or postschool stages.	.05
	(2) Families in prechild stage increased $18 more than those in postchild stage.	.10
	(3) Families in postchild stage increased about $10 more than those in preschool, school and postschool stages.	.20
Dominant farm goal orientation	(1) Farmers with high level of living or success orientation increased $22 more than those with security orientation.	.01
	(2) Farmers with high level of living or success orientation increased $16 to $19 more than those oriented toward farm production, farming as a way of life, or average living.	.05
Attitude toward farming as an occupation	Farmers very well or fairly well satisfied increased $6 to $15 more than those indifferent to not satisfied.	.05
Attitude toward role of science in agriculture	Farmers rating agricultural research very important or important increased $2 to $5 more than those rating it not important.	*

*Not significant at .20 level.

TABLE 6. Variables related to change in soil management and fertilization practices, experimental sample.

Variable	Average	Change in soil mgt. and fert. score associated with specified change in independent variable		
		Increase in independent variable	Change in soil mgt. & fert. score	Significance level
Dependent:				
Change in soil mgt. and fert. adoption score	18			
Independent — quantified:				
Soil mgt. and fert. adoption score 1953	29	1 point	–.7	.01
Total farm capital investment 1953	$47,225	1,000 dollars	0	*
PMWU per tillable acre 1953	2.29	.1 unit	–.2	.20
Net farm income 1953	$ 4,561	100 dollars	0	*
Months worked off farm 1953	1.69	.1 month	.1	*
Change in months worked off farm 1953-58	.23	.1 month	0	*
Total extension participation score 1955-58	158	1 point	.1	*
No. of school grades completed	10.8	1 grade	–.2	*

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	(1) Families in prechild stage increased 11 more than those in postchild.	.05
	(2) Families in preschool, school and postschool increased 5 to 7 more than those in postchild.	.10
Dominant farm goal orientation	Farmers in high level of living and success orientations increased 8 more than those in security, 9 more than those in farm production, and 11 more than those in average living and farming as a way of life orientation.	.01
Attitude toward farming as an occupation		*
Attitude toward role of science in agriculture	Farmers rating agricultural research very important or important increased 2 to 3 more than those rating it not important.	*

*Not significant at .20 level.

TABLE 7. Variables related to adoption of new farm practices, experimental sample.

		Change in new adoption score associated with specified change in independent variable		
Variable	**Average**	**Increase in independent variable**	**Change in new adoption score**	**Significance level**
Dependent:				
New farm practice adoption score	46			
Independent — quantified:				
Total farm capital investment 1953	$47,225	1,000 dollars	.3	.01
Total farm practice adoption score 1953	42	1 point	.1	•
PMWU per tillable acre 1953	2.29	.1 unit	—.2	•
Net farm income 1953	$ 4,561	100 dollars	0	•
Months worked off farm 1953	1.69	.1 month	0	•
Change in months worked off farm 1953	.23	.1 month	—.1	•
Total extension participation score 1955-58	158	1 point	.1	.05
No. of school grades completed	10.8	1 grade	—.2	•

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	(1) Families in prechild stage increased 28 more than those in postschool.	.01
	(2) Families in prechild increased 14 more than those in postchild.	.10
	(3) Families in postchild increased 14 more than those in postschool.	.10
Dominant farm goal orientation	Farmers high level of living oriented increased 1 to 3 more than those in other categories.	•
Attitude toward farming as an occupation		•
Attitude toward role of science in agriculture		•

•Not significant at .20 level.

TABLE 8. Variables related to change in total farm practice adoption, experimental sample.

Variable	Average	Change in total adoption score associated with specified change in independent variable		Significance level
		Increase in independent variable	Change in total adoption score	
Dependent:				
Change in total farm practice adoption score	17			
Independent — quantified:				
Total farm practice adoption score 1953	42	1 point	−.7	.01
Total farm capital investment 1953	$47,225	1,000 dollars	0	*
PMWU per tillable acre 1953	2.29	.1 unit	0	*
Net farm income 1953	$ 4,561	100 dollars	.1	.20
Months worked off farm 1953	1.69	.1 month	0	*
Change in months worked off farm 1953-58	.23	.1 month	−.1	.05
Total extension participation score 1955-58	158	1 point	.1	.01
No. of school grades completed	10.8	1 grade	.2	*

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	(1) Families in prechild and postschool increased 5 more than those in postchild. (2) Families in preschool and school increased 3 more than those in postchild.	* *
Dominant farm goal orientation	Farmers in high level of living and success orientations increased 5 to 6 more than those in average living, farming as a way of life and farm production orientations.	.10
Attitude toward farming as an occupation	Farmers very well or fairly well satisfied increased 3 to 4 more than those indifferent to not satisfied.	*
Attitude toward role of science in agriculture	Farmers rating agricultural research very important or important increased 4 more than those rating it not important.	.20

*Not significant at .20 level.

Attitudinal items reflecting farmers' satisfaction with farming as an occupation and the importance they attached to agricultural research were used in the analysis of relationships. Attitude toward farming was somewhat useful in explaining changes in the behavioral variables, especially changes in total PMWU and expenses per tillable acre. Attitude toward research was not a useful explanatory variable.

Importance of Situational Variables

Farmers in the post-child stage in the family cycle tended to make more increase in total farm capital investment than those in earlier stages in the cycle. On the other hand, farmers in the earliest stages of the family cycle tended to make the greatest increases in expenses per tillable acre. Families in earlier stages may have been able to find sufficient operating capital to increase production through intensification per acre, whereas they may not have been able to control sufficient capital to make large increases in investments. Also, farmers in earliest stages made significantly more progress in adopting farm practices than farmers in later stages, with the relationship generally proceeding in a regular progression from earlier to later stages.

In each of the regressions, the level of the behavioral variable at the beginning of the experiment was included as an independent variable. Plausible hypotheses regarding the effect of beginning levels might be: 1. those who start at lower levels will make more change because they have further to go; 2. those at the higher levels will make more change because they have already demonstrated willingness and ability to make changes; and 3. there is more possibility for change near the middle since these farmers have more room for expansion than the higher group and may have more personal and financial potential than those in the lower group.

Almost without exception there was a significant negative correlation between beginning levels of the variables studied and changes in them during the experimental period, indicating that increases were most often associated with lower and medium beginning levels.

Since the behavioral variables represented change from 1953 to 1958, decreases were possible and did in fact occur on some farms. In the case of recommended farm practices, little opportunity for increase was possible for those farmers who were already following most of the recommended practices at the beginning of the experiment. For all of the change items, the usual principles of marginal analysis would seem to apply: i.e., further increase may have appeared less profitable to farmers who had already reached high levels by the base year. In addition, deflating for price produced decreases in capital investment on farms with large livestock, feed and crop inventories at the beginning and where little new investment took place during the period.

A number of situational variables which reflected the organizational and financial position at the beginning of the experiment were included in the analysis. Total investment was included to see if the farm capital base had an influence on ability to make other changes. Some studies, for example, have shown that amount of capital had a strong positive relationship to farm practice adoption.

The analysis indicated that capital investment was positively correlated with adoption of new practices (perhaps because some of them required investments in equipment) but had little relationship to other change variables. Beginning level of capital investment (regardless of ownership) was a better predictor of change than beginning net worth.

PMWU per tillable acre served as an indicator of the intensity of farm organization at the beginning of the period. Larger increases in capital investment, in total PMWU, and in expenses per tillable acre were made by the farmers who were farming most intensively at the beginning of the experiment. This would seem to indicate that the township program reached some of the farmers farming rather intensively on small acreages, whereas this is less often the case under county extension programs in Michigan.

In previous studies, net income has been found to be positively correlated with practice adoption (although it has not been clear which came first). In the present research, beginning level of net farm income had little relationship to changes in practices, but was positively associated with increase in capital investment and to a lesser extent increase in total PMWU. It seems logical that part of a higher stream of net income could be directed into capital acquisition.

Large amounts of off-farm work might be expected to be negatively related to changes in farming because of competition with farm operations, and because it may reflect lack of interest in farming as a full-time occupation. On the other hand, earnings from off-farm work may be helpful in building the farm business. The analysis revealed that the amount of time the operator spent off the farm was a more significant variable than total receipts from nonfarm work by both the operator and his wife.

Months worked off farm in 1953 and changes in months worked off farm from 1953 to 1958 were negatively associated with change in capital investment and total PMWU. Both were associated with small increases in expenses per tillable acre. Increase in off-farm work appeared to have a depressing effect on practice adoption.

Some studies have shown that owners or part owners are higher changers than renters. Neither a three-category variable of ownership status nor percent of land rented was significantly related to the six change variables at the .20 level.

Importance of Intervening Variables

Extension participation was the intervening variable of greatest interest in the analysis of relationships. The basic hypothesis underlying the entire township experiment was that farmers in small geographic areas who had the help of a special agent in an intensive program would make more progress (on variables implied in the program objectives) than farmers who had only the extension help available from the county extension office.

Assuming that the control samples are reasonably useful for comparison, the rather substantial differentials in progress between the experimental and control samples on a number of change variables may be accepted as evidence of the impact of the township program. Further, it was observed that farmers in the experimental areas especially made more progress in changes that were specifically emphasized by the township agents: soil and crop practices generally, increased size of business in Newton, movement out of agriculture in the Tri-Township area, more livestock in Denmark, and increased corn yields in Almont and Odessa, to give an illustrative but incomplete list.

Because of the special interest in extension participation, subscores for extension reading and listening, activities and events, and individual contacts were included in the preliminary regression analyses and total extension participation scores in the final runs. Extension participation showed a significant relationship to only a few of the change variables. Since all the farmers in the experimental sample had access to the township program, only the differential rate of participation among farmers in the experimental sample could influence the relationship.

The overall level of extension participation, (two and one-half times higher in the experimental than in the control sample for 1955-58) was in effect controlled by dividing the farmers into experimental and control samples: with all experimental and control farms in one sample, extension participation would undoubtedly show up as quite a significant variable. Further, the usual principles of marginality likely apply to extension participation; some of the farmers in the experimental areas had probably reached levels of participation that were so high that the additional units of participation were of relatively less value in producing additional change.

Changes in the behavioral variables showed no significant association with the newspaper-magazine score, nor with three measures of formal participation that were used in the analysis.

Factors Related to Changes in Outcome Variables

Regression procedures were also used in analyzing factors related to changes in outcome variables. As in the case of the behavioral variables, the preliminary analysis started with a larger number of dependent and independent variables, then narrowed down to the dependent variables of greatest interest and the independent variables which were more closely associated with variation in them. The outcome variables selected were 1. change in crop yield index, 2. change in dairy products sales per cow, 3. change in total farm production, 4. change in net earnings, and 5. change in net worth.

Behavioral and situational variables were considered to have the most direct relationship to changes in the outcome variables (Fig. 1). Thus the independent variables selected were primarily those representing beginning levels of changes in farming operations. Predispositional and intervening variables were considered to have direct influence on the behavioral variables, but not directly on the outcome variables. However, a few predispositional and intervening variables of special interest, such as dominant family goal orientation and extension participation were included.

Variables related to changes in the outcome variables for the experimental sample are summarized in Tables 9 through 13. These tables may be interpreted the same as those for changes in the behavioral variables. The analysis of change in dairy products sales per cow applies only to the 61 farms having a dairy enterprise in both 1953 and 1958.

TABLE 9. Variables related to change in crop yield index, experimental sample.

Variable	Average	Change in crop yield index associated with specified change in independent variable		
		Increase in independent variable	Change in crop yield index	Significance level
Dependent:				
Change in crop yield index	18			
Independent:				
Crop yield index 1951-1953	93	1 point	—.9	.01
PMWU per tillable acre 1953	2.29	.1 unit	1.4	.01
Soil mgt. and fert. practice adoption score 1953	29	1 point	.9	.05
Percent of land rented 1953	24	1 percentage point	—.1	•
Months worked off farm 1953	1.69	.1 month	—.3	.05
Change in tillable acres 1953-58	14	1 acre	—.1	•
Change in soil mgt. and fert. adoption score 1953-58	18	1 point	.1	•
Change in months worked off farm 1953-58	.23	.1 month	—.2	.20
Change in net farm earnings 1953-58	1,500	100 dollars	0	•
Total extension participation score 1955-58	158	1 point	.1	•

•Not significant at .20 level.

Sequence of Changes in the Change Process

In addition to measuring progress made by farmers by the end of the five-year experimental period, insights into the sequence and timing with which changes occurred in people and on farms as a result of the township program were sought. Information was obtained through the formal analysis of relationships, through informal observations, and through individual case studies conducted by Goering (6).

The research focused attention on the importance of predispositional and situational factors in influencing changes in farming operations. At any point in time, motivation to change appears to be positively related to such things as strong, clearly formulated goals and favorable attitudes toward change; toward farming; and toward the use of credit and the like. These predispositional factors may be instrumental in leading a farmer to participate in an extension program such as the township program. They may also lead directly to change in farming operations, and at a later stage in the change process they may influence outcomes through decisions such as whether to reinvest or to consume. Situational factors may provide opportunity for or stimulate change, or may present obstacles to change.

In some cases changes in farming operations were triggered by important events, such as the farmer who was forced to liquidate his dairy herd because of Bangs disease. However, it appeared that change seldom resulted from a single event of considerable importance, but more often was the end result of the interplay of a wide variety of

TABLE 10. Variables related to change in dairy products sales per cow, experimental sample.

		Change in dairy products sales per cow associated with specified change in independent variable		
Variable	Average	Increase in independent variable	Change in dairy products sales per cow	Significance level
Dependent:				
Dairy product sales per cow	$26			
Independent:				
Dairy products sales per cow	$297	10 dollars	−6.90	.01
PMWU per tillable acre 1953	2.55	.1 unit	3.38	.10
No. of dairy cows 1953	18	1 cow	−2.57	•
Dairy practice adoption score 1953	60	1 point	3.02	.05
Months worked off farm 1953	1.03	.1 month	.02	•
Change in No. of dairy cows 1953-58	7.2	1 cow	−1.89	.20
Change in dairy practice adoption score 1953-58	6.0	1 point	1.80	.10
Change in months worked off farm 1953-58	.18	.1 month	−.13	•
Change in net farm earnings 1953-58	$ 2,063	100 dollars	2.00	.01
Total extension participation score 1955-58	187	1 point	.11	•

•Not significant at .20 level.

TABLE 11. Variables related to change in deflated total value of farm production, experimental sample.

Variable	Average	Change in farm production associated with specified change in independent variable		
		Increase in independent variable	Change in farm production	Significance level
Dependent:				
Change in deflated total value of farm production	$ 4,274			
Independent:				
Total value of farm production 1953	$11,305	1,000 dollars	50	*
PMWU per tillable acre 1953	2.29	.1 unit	1	*
Total farm practice adoption score 1953	42	1 point	63	.05
Months worked off farm 1953	1.69	.1 month	−18	.10
Net farm income 1953	$ 4,561	100 dollars	4	*
Change in tillable acres 1953-58	14	1 acre	22	.01
Change in machinery investment 1953-58	$ 967	100 dollars	3	*
Change in livestock investment 1953-58	$ 925	100 dollars	−5	*
Change in PMWU per T.A. 1953-58	.27	.1 unit	−42	.10
Change in total machinery expense 1953-58	$ 472	10 dollars	26	.01
Change in total feed expense 1953-58	$ 730	10 dollars	15	.01
Change in total crop expense 1953-58	$ 336	10 dollars	8	.05
Change in total farm practice adoption score 1953-58	17	1 point	46	.10
Change in crop yield index 1953-58	18	1 point	11	.20
Total extension participation score 1955-58	158	1 point	1	*

*Not significant at .20 level.

dissimilar forces. These forces included such diverse elements as the weather, family health, farm prices, an outbreak of crop or livestock diseases, the availability of land for purchase or rent, crop yields, institutional elements, and the availability of credit.

Analysis of change in response to the township experiment suggests that important interrelationships exist among the explanatory variables, with the lines of association running from one explanatory variable to another until eventually changes occur in the outcome variables.

On farms where substantial changes were made, informal observations and the individual farm case studies indicated that one some-

TABLE 12. Variables related to change in net farm earnings, experimental sample.

		Change in net farm earnings associated with specified change in independent variable		
Variable	Average	Increase in independent variable	Change in net farm earnings	Significance level
Dependent:				
Change in net farm earnings	$ 1,500			
Independent — quantified:				
Net farm income 1953	$ 4,561	100 dollars	−3	*
Total farm capital investment 1953	$47,225	1,000 dollars	20	.05
PMWU per tillable acre 1953	2.29	.1 unit	−3	*
Total farm practice adoption score 1953	42	1 point	11	*
Months worked off farm 1953	1.69	.1 month	−4	*
Change in total farm practice adoption score 1953-58	17	1 point	5	*
Change in total value of farm production 1953-58	$ 4,274	100 dollars	37	.01
Change in gross income per man	$ 2,736	100 dollars	97	.01
Change in gross income per $100 expense 1953-58	−6.71	1 dollar	39	.01
Change in gross income per $1,000 capital investment 1953-58	−4.13	1 dollar	−3	.10
Total extension participation score 1955-58	158	1 point	5	.10
Independent — in categories:		Description of relationship		Significance level
Stage in family cycle		(1) Families in preschool and school stage increased 800 more than those in postchild stage.		.05
		(2) Families in prechild stage increased $500 more than those in postchild stage.		.10
Dominant family goal orientation		Living oriented farmers increased $450 more than children or family oriented, and $550 more than security or status oriented.		.20

*Not significant at .20 level.

TABLE 13. Variables related to change in deflated net worth, experimental sample.

Variable	Average	Change in net worth associated with specified change in independent variable		
		Increase in independent variable	Change in net worth	Significance level
Dependent:				
Change in deflated net worth	$11,763			
Independent — quantified:				
Net worth Jan. 1, 1954	$43,742	1,000 dollars	—1	•
Total farm capital investment 1953	$47,225	1,000 dollars	40	•
Months worked off farm 1953	1.69	.1 month	43	•
Net farm income 1953	$ 4,561	100 dollars	156	.01
Change in real estate investment 1953-58	$ 3,702	100 dollars	17	.01
Change in machinery investment 1953-58	$ 967	100 dollars	230	.01
Change in livestock investment 1953-58	$ 925	100 dollars	14	•
Change in months worked off farm 1953-58	.23	.10 month	93	.01
Change in net farm earnings 1953-58	$ 2,063	100 dollars	59	.20
Total extension participation score 1955-58	158	1 point	16	•

Independent — in categories:	Description of relationship	Significance level
Stage in family cycle	Families in prechild stage increased more than those in later stages.	.20
Dominant family goal orientation	(1) Security and status oriented farmers increased 4,000 more than children or family oriented.	.20
	(2) Security and status oriented farmers increased 2,000 more than living oriented.	•

•Not significant at .20 level.

what typical sequence of changes was 1. awareness of the program plus the hope or expectation that it might provide help in meeting farm or family goals; 2. partial participation in the program; 3. receiving information and counsel through the program (which sometimes had an impact in altering goals and attitudes); 4. making modest changes in farm practices; 5. observing that these practices worked out and seemed to pay off; 6. participation in the program at a deeper level; 7. making bigger organizational changes in the farm business; 8. these changes paying off in terms of higher production and higher efficiency; 9. higher net farm earnings; and 10. increases in level of living, net worth or other goal attainment such as less work, more leisure, more success, prestige or status, or greater satisfaction with life on the farm.

There was, of course, wide variation among farm families in both the extent and the order in which change took place in response to the program. Some useful observations and generalizations can be made, however. In the following paragraphs, information on changes in farming operations accomplished by experimental farmers is presented in roughly the order or sequence in which the changes most typically were made.

Changes in Farm Practices

On most farms, the first changes made in response to the township experiment were practice changes. The first practices changed generally were tillage, soil management, fertilization, and crop culture practices. Many farmers made significant changes in soil and crop practices during the first and second years of the experiment. This was due to the fact that all of the township agents concentrated on soil and crop practices at the beginning of the program—partly because it was easier in the beginning to work with some farmers on these practices, partly because the agents saw the need for improved practices, and partly because the agents could see possibilities for showing the results of their work more quickly in this area. Another reason for quicker change in soil and crop practices was that they are easier for farmers to make than some kinds of organizational changes, and they also require less capital investment.

The research indicated that farmers who made large changes in certain practices did not necessarily make large changes in other practices. Simple correlations among changes in practice adoption subscores such as soil management and fertilization practices and crop culture practices ranged from —.02 to .23. This tendency on the part of farmers was also evidenced in their responses to questions on the terminal survey.

In connection with a series of questions on farmers' self ratings of their willingness to accept change, respondents were asked two parallel questions: 1. "Are there any kinds of things you tend to do before other farmers?" and 2. "Are there any kinds of things you let other farmers try out before you accept them?" In each case, if the respondent said "yes" he was asked what kinds of things. Seventy-one percent of the total experimental sample and 76 percent of the total control sample listed one or more things they tended to try before other farmers; at the same time 83 percent of the total experimental sample and 76 percent of the total control sample listed one or more things they let other farmers try before accepting them.

In one phase of the research on the township experiment, Bittner provided evidence that farmers who are early adopters of practices on one enterprise are not necessarily early adopters on other enterprises, especially if some are major and some minor enterprises. On one sample of farmers, Bittner obtained a correlation coefficient of .12 between the respondents' dairy practice adoption indexes and their swine practice adoption indexes. On another sample, he obtained a coefficient of .19 between the dairy and poultry adoption indexes (3).

The conclusions from the township experiment regarding farmers' practice adoption behavior is contrary to expectations based on previous research. For example, on the basis of time of adoption of new farm practice, Beal and Rogers classified farmers into five adopter categories as follows: innovators, early adopters, early majority, late majority and laggards (2).

In practice adoption research it appears that more attention needs to be given to the characteristics of different practices *vis-a-vis* individual farmer characteristics and circumstances. Characteristics of a practice may have an important influence on speed of adoption; these characteristics may influence all farmers alike as usually has been assumed in practice adoption research, or they may elicit differential reactions depending upon the predispositions and circumstances of individual farmers. Examples of practice characteristics which may bring forth differential reactions among farmers are: 1. relative advantage over the old practice (in terms of increased yields, increased net returns or decreased labor required), 2. amount of new capital investment required, 3. amount of risk and uncertainty involved, 4. change in habit or custom involved, 5. inconvenience and necessity of learning new physical skills, and 6. managerial ability required to adopt the practice and make it work successfully.[8]

Changes in Cash Expenses

Following changes in farm practices, increasing current cash expenditures was the shift which frequently occurred in the sequence of change. On the average, farmers in the experimental sample increased their total cash farm expenditures per tillable acre about five times more than the increase in the control sample. The increase in cash expenditure was somewhat related to the adoption of practices as a substantial part of the increase was in fertilizer and other crop expenses. Feed and livestock expenses per tillable acre also increased more on experimental than on control farms.

Changes in Resource Organization and Investments

Larger changes in resource organization and increased investments often followed changes in practices and increases in farm expenses. Many farmers in the experimental areas made substantial increases in volume of business during the experiment. The largest number of farmers who expanded operations did so by increasing their acreages, associated machinery investments, and total cash farm expenses, with little change in labor inputs.

Many of the farm changes, particularly changes in resources, required additional capital outlays. Experimental farmers increased their use of borrowed capital more than control farmers did during the period. Starting from about the same level in 1953, experimental farmers were using about 70 percent more borrowed capital in 1958 than control farmers.

Changes in Enterprise Organization

While some farmers increased their size of business by adding land and associated inputs, other farmers increased their volume of business by intensifying and building up production per acre. A number of farmers shifted in the direction of higher-valued crops—less oats, less hay and pasture (percentagewise) and more corn and other higher-valued crops. The shift toward larger acreages of corn, field beans and sugar beets was particularly strong in Denmark township, where the township agent stressed the importance of higher-valued crops.

Some cash crop farmers, especially in the Denmark area but also in Odessa, added a livestock enterprise to their farming operation for the first time during the experimental period. In the Denmark area, a number of farmers added swine or feeder cattle enterprises. Data from the farm surveys showed that the average number of feeder pigs per farm (on the basis of all farms) increased from 6.4 to 46.4 on Denmark experimental farms, and that it decreased from 3.2 to .4

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[8] To the extent that farmers do in fact adopt some kinds of practices earlier and some later, question must be raised regarding the usefulness from either a descriptive or an analytical standpoint of the adopter categories emphasized by some rural sociologists. It also brings into question the analytical usefulness of measures such as the total farm practice adoption score used in this research.

on control farms. There was a smaller, but significant, differential increase in feeder cattle.

For the experimental sample as a whole, livestock investment increased an average of $2,221 per farm (as compared to an average increase of $1,296 for the control sample). The number of farms on which specified livestock enterprises were kept generally decreased in both experimental and control samples during the experimental period, although the decrease was greater in control samples.

The average sizes of herds and flocks on farms that had the enterprises increased substantially more for the experimental than the control, especially in the Newton area where the agent emphasized the need for larger volume of business and greater specialization. For example, the average size of dairy herd (on farms with dairy cows) increased by 13 cows in Newton as compared to an increase of one cow in the Newton control sample.

Changes in Crop Yields and Rates of Production on Livestock

The higher rates of cash inputs coupled with the adoption of improved soil and crop practices resulted in some differential increase in crop yields in favor of the experimental group (20 percent versus 13 percent increase in crop yield index), with some of the differential increase showing up in the first two years of the experiment.

Experimental farmers showed moderately more increase than the control group in the number of pigs saved per litter (+2.8 versus +1.0), lambs per 100 ewes (+15 versus 0), and egg sales per hen (+$1.27 versus +$.39). As a result of the Newton agent's success in promoting the adoption of improved livestock practices, output of livestock products per unit increased much more than in the control area and more than in any other experimental area; for example, dairy product sales per cow increased $82, as compared to $2 for the control group and hog income per litter increased $32, compared to a decrease of $22 for the control group.

Changes in Total Farm Output

The increased inputs, higher yields, increased emphasis on higher-valued crops, and heavier livestock loads produced a sizeable differential between the experimental and the control in total farm output. Value of total farm production (in 1953 dollars) increased $5,626 for experimental farmers as compared to an increase of $3,374 for the control.

Changes in Net Farm Earnings

By the end of the experiment, the value of the higher output more than covered the increased operating costs and led to significantly greater increases in net farm earnings on experimental than on control farms (+ $1,646 vs. + $938).

Changes in Level of Living

To the extent that changes paid off in increased earnings, the increased earnings could be used to obtain a higher level of living or used to pay off debt or in other ways used to build up the family's net worth.

Level of living indicators revealed that experimental farmers made slightly more progress than control farmers in obtaining items which would contribute to higher levels of living.

Changes in Net Worth

Total value of farm property owned by operating families increased $25,698 during the experimental period. This resulted partly from inflationary increases in the price of land, partly from increases in acreages of land owned, and partly from investment in buildings, livestock, feed and crops. Nonfarm assets increased an average of $3,963.

Farm families in the experimental group had an average increase in net worth of approximately $25,000 as compared to an average increase of $20,000 for control families.

Interrelationships Among Changes

The correlation analysis provided some insights on the extent to which certain changes in farming operations were related to other changes.

On the basis of economic theory and observation of farmer behavior, associations among certain kinds of changes were predictable. For example, as would be expected, there were fairly high correlations among changes in the various input items (i.e., simple correlation coefficients of .30 to .59, with a few of .60 or above).

Correlations among the various changes in enterprise organization were generally low ($r = .29$ or below).

Increase in PMWU per tillable acre was correlated fairly highly with change in number of animal units (particularly dairy cows), percent of gross income from livestock, percent of tillable acres in row crops, total feed expense, and total expense per tillable acre.

In many cases one change in the farm business necessarily preceded, accompanied or followed other changes. Adoption of certain kinds of technology required substantial capital outlays for buildings and equipment and required farm reorganization and increased volume to make the investment pay off; expansion in the size of an enterprise made the use of new technology essential.

As a specific example, during the experimental period a number of dairy farmers decided it would be desirable to expand the size of their herds substantially; this resulted in large investments in barn space, silos and milking equipment, and frequently in bulk tanks, pipeline milkers and automated feeding equipment. These farmers then discovered that paying off the investment required such a large stream of income that further expansions in the size of the herd appeared essential.

In response to the township program, some farmers made big organizational changes in their farming operations first, followed by changes in practices. However, more started with smaller changes such as changes in selected farm practices. A number of farmers really "took off"—that is, they made many large changes in their farm businesses, such as making substantial new investments, expanding the size of their businesses and adopting new technology. However, a larger number of experimental farmers made no extensive changes, but made moderate improvement in a number of factors. Near the end of the experiment, the township agents concurred in the belief that only a few farmers can and will make big, drastic changes and that the biggest contribution extension agents can make is get a lot of people to make more modest changes.

The township agents noted that some farmers were willing to change just as quickly as a new idea which appeared applicable was made known to them. Others needed more time to consider things and adjust to new ideas. On the terminal survey in response to a series of questions regarding change, many farmers emphasized that they were willing to change, but that they wanted to see how previous changes were working before taking the next step.

Obstacles to Change

Because of all previous events combined in the change process, a farmer may decide to make substantial changes in his farm business. But the changes may never come about because of obstacles that may be encountered. The farmer may not go ahead with the change because he cannot gain control of the capital needed to make the changes. Illness of himself or family members, outbreak of disease, bad weather, or influence of people with whom he interacts may also discourage him from going ahead. Or, after getting into the change he may decide that a goal is not worth pursuing because of the difficulty and disagreeableness of the process through which he must go to attain the goal.

Priority given to moving ahead on attainment of some goals may mean postponing or giving up other goals. Managerial ability turns out to be a limiting factor in some instances; often higher managerial ability is needed to manage larger, more complex units, and not all farmers have the necessary managerial skill.

To see whether inability to obtain credit had been an obstacle to farm or family goal attainment, farmers were asked on the terminal survey whether they had been unable to borrow as much money as they wanted to borrow any time during the previous five years. Seven percent of the experimental farmers said they had not been able to borrow as much money as they believed they needed. Insufficient credit was reported more often by farmers in the Odessa and Tri-Township areas than in other areas. Self rationing of credit was probably a much more serious obstacle to goal attainment than lender rationing.

On the terminal survey, farmers in the samples were asked a set of questions regarding their willingness to use credit for four major farm inputs (land, fertilizer, livestock and machinery). Some farmers were willing to use credit to obtain certain farm production items, but not others. For each input category, about 20 percent of the farmers said they would not borrow under any circumstances and 5 to 10 percent said they would borrow only under certain conditions. Only 46 percent of the farmers indicated they would use credit without reservation for all four purposes.

Farmers' responses to the questions indicated that, where profitable investment opportunities existed, farmers' attitudes toward the use of credit could be a moderate to serious obstacle to nearly half of the sample farmers in preventing them from using as much credit as would be profitable. These attitudes might be a particularly crucial factor in explaining farmers' responses to an extension program such as the township experiment, since many of the farm development plans worked out by farmers with the help of the township agents required increased investments.

Another form of obstacle to goal achievement may be insufficient income to make all of the expenditures desired, a problem which is common to many farm families. In farming there is strong interdependence between the business firm and the household since the farm family is both a producing and a consuming unit. If income is insufficient to make farm investments and expenditures because of the necessity or the family's decision to make home and family expenditures, this will have an impact on future farm production and income. On the other hand, decisions to make major investments in the farm business may prevent the farm family from moving to higher levels of living in the short run.

On the terminal survey, farmers in the experimental and control samples were asked if they could recall instances during the previous five years in which they had to choose between making an expenditure for the farm and one for the home when the lack of income ruled out the possibility of doing both. Farmers who said "yes" were asked to specify the farm and home items involved in the conflict, and to describe how the conflict was resolved.

Sixty percent of the total experimental sample and 43 percent of the total control sample cited one or more specific instances of farm-home conflicts in income use during the experimental period. Conflicts between purchases of farm machinery and various home items were mentioned most frequently. Farm machinery purchases most often were in conflict with the purchase of basic home equipment items such as ranges, refrigerators and washing machines.

The fact that conflicts in the use of income were perceived more often by experimental than by control farmers may be attributable to the township program through motivation provided and through emphasis on investments in the farm business (the higher frequency of perceiving conflicts cannot be attributed to lower incomes on the part of the experimental farmers).

There was some tendency, as would be expected, for lower income operators to report farm-home conflicts more frequently than those with higher incomes. Some families had reduced the amount of farm-home conflict in the use of income by the operator or wife working off the farm to increase the family income.

Farmers in the middle stages in the family cycle reported conflicts more often than those in the earlier or later stages. Since conflicts would be expected more often for younger farmers, those in the earlier stages may have felt they were faced with purchases which were such necessities that conflicts were less seldom perceived.

In the total experimental sample, 66 percent of the farm-home conflicts reported were resolved in favor of the farm, 15 percent resolved in favor of the home, and 19 percent resolved through some kind of compromise. Farmers in the control sample more often resolved conflicts in favor of the home than farmers in the experimental samples. The fact that experimental farmers more often resolved farm-home conflicts in favor of the farm is probably attributable to the emphasis on farm production, farm reorganization, adoption of new technology, and increased earnings in the township program.

Implications for Further Change

The total impact of the experiment on farms probably had not taken effect by the end of the five-year period. In the first place, it took the township agents one and one-half to two years to firmly establish themselves and their programs. After farmers had sufficient confidence in the program time was needed for the farm families to absorb the information and make decisions about their farming operations. Once decisions regarding important changes in farming operations were made, it takes time to implement the decisions—for example, to arrange financing, to study and adopt new technology, and to build new buildings.

After changes have been made, it takes time for the changes to have an impact on production, then farm earnings, and to be reflected in higher levels of living or higher net worths. The township experiment focused attention on a five-year period in the continuing life span of the farmers involved.

During the experimental period, farmers in the experimental samples concentrated on building up their farming units rather than emphasizing immediate consumption. This behavior is probably attributable to the township program. The township agents emphasized farm development programs which included increases in farm size, farm reorganization, and adoption of new technology. Many of these changes required investments in the farm business. In response to questions on progress in goal achievement, a number of farmers in the experimental samples said specifically that they had postponed expenditures for home and family items in favor of building up their farming operations.

The rates at which experimental farmers were making farm capital investments were compared with rates for the control farms. Starting from essentially the same level in the benchmark year, the annual rate of outlay for investment purposes increased about twice as much on experimental as on control farms. Thus in the terminal year, experimental farmers on the average were investing about $1,000 more annually than control farmers in investments such as land, buildings, drainage and soil improvement.

To the extent that the township program resulted in farmers increasing their capital outlays, it may have had a depressing effect on level of living (and possibly even net earnings) while the farm development programs were being undertaken. The higher rate of investments in productive farm assets in the experimental areas as compared to the control areas may have resulted in still further increases in farm earnings, and these may be reflected in higher levels of living in the years following the termination of the experiment.

CONCLUSIONS AND IMPLICATIONS

It could be expected that results attained in the township experiment could be duplicated if a similar extension program were conducted in areas where comparable kinds of farm people and farming opportunities exist, using agents with skill and experience similar to that of the Michigan agents who served in the program. The experimental areas were untypical in the sense that all of the township areas expressed willingness to enter into the experimental program and provide financial support to it, although it may be noted again that two of the areas had previously cooperated little in extension activities and the same applied to a lesser extent to farmers in a third area.

The township program was set up and operated as an experiment for a definite period of time, and then the experimental phase of it terminated. From the viewpoint of the Kellogg Foundation, the extension administration, and the program evaluator, the program was in fact an experiment. From an operating standpoint, the township agents conducted the program as a demonstration. It is possible that more new insights might have been gained if the agents had proceeded more nearly as if they were conducting an experiment than a demonstration which was sure to succeed.

Because of the experimental nature of the program, the results may not be typical of such an intensive program after it has become established and is operating on a continuing basis.

Several factors about the experimental program could attribute to greater change than could normally be expected. First was the fact that the agents were well above the average of extension field agents in terms of background, training and experience. The experiment would have been more useful in this respect if one or more newer or more nearly average agents had been used in the experiment. Operating programs would normally not have a full-time coordinator and a half-time farm management specialist such as were assigned to the township program through part of the experiment. Also, a larger than average amount of specialist help was requested and received by the township agents.

On the other hand, there were several experimental factors which kept the program from operating at the efficiency that could be expected of an established program. At the beginning, the agents were not sure what was expected of them, and had little precedent to go by. Throughout the experiment they were called upon to spend considerable time with members of the press and visitors from many places.

The evaluation research took some of the agents' time and was a somewhat disrupting influence as far as the agents and their operating programs were concerned. During the last one and one-half years of the experiment, the agents devoted considerable time and energy to organizing the votes regarding the continuation of the program.

It may be recalled that the experimental samples were random with respect to extension participation, and included nonparticipators and low participators as well as medium and high participators in the program. Clearly, more progress could be demonstrated under an experimental program in which all of the farmers in the samples are participators in the program, and where the researchers measure only changes related specifically to the educational activities of the extension personnel rather than changes implied by a set of broad general objectives.

Conclusions Regarding Financing

Experimenting with systems of financing extension work was one of the secondary objectives of the township experiment. At various points in the experiment, the state extension director expressed strong conviction that it would be highly desirable to add township and municipal financing to the federal-state-county system of financing extension work. His thinking on the subject is summarized as, "My major viewpoint here is to devise the means to expect a stronger local share in the financing of extension work. Not so much are the dollars concerned here . . . as is the simple principle of gearing more directly the expanded services of extension work to the expressed desires of the people. I can be no less dogmatic than to exclaim that if we have a program, if the people and their leaders are in on it and know of it—then the truest evaluation of our effort is the extent to which local people will demand more of it and support it (9)."

In the experiment, raising local finances through voluntary contributions turned out to be a disruptive influence as far as the educational program was concerned. The farmers on the boards of directors found raising finances through this means particularly disagreeable, and it also added to the pressures on the township agents. Because of the way in which local finances were raised, the township agents at times felt compelled to carry out activities which had highest chance of short-run gains, such as help in buying, selling, personal services and changes in farm operations which might pay off in a year or less.

It is true that the agents also got around to more basic educational work, and that pressures on agents to produce results were not all bad. On the other hand, voluntary contributions are not a feasible or stable way of raising finances to support extension. Some other system of financing the program would have permitted the agents to concentrate on their more basic and long run educational objectives.

At the end of the experiment, the farmers and agents who were involved in the township program generally agreed that local farmers or local areas should pay at least part of the cost of intensive extension programs that are operated for their benefit. There was considerable difference of opinion, however, in regard to the proportion of the cost the local areas should pay and how the money should be raised.

The Newton township agent and the farmers in his area were thoroughly convinced that an association membership basis is by far the best way to finance an intensive on-the-farm program. The Denmark township agent and some of the farmers in the Odessa area shared this view. Under this system of financing, the agent would be available only to the members of an extension association who paid annual fees to support the work. Memberships of 75 to 100 and annual fees of $40 to $60 per farmer per year were frequently mentioned as possibilities; the total fees implied in such a system would cover from one-fourth to one-half the cost of operating an intensive program.

Farmers and agents who were enthusiastic about this system of financing argued that participating farmers should pay substantial fees because they would benefit most from the program. They also argued that farmer members would have a keener interest in the program and make more use of it because they had a direct financial stake in it. However, they argued that part of the cost of conducting the program should be paid from public funds because the new knowledge obtained from such intensive programs is of help to the entire extension service, and because the effect of the program spreads to non-participating farmers in the community.

The Tri-Township, Almont and Odessa agents believed strongly that intensive programs should be financed through taxation at various levels, including the township level. They generally felt that the most feasible system would be for three or four townships to get together to provide financial support for the program.

On the terminal survey, farmers in the experimental sample were asked what they thought was the best way of raising local finances for extension; 49 percent said put it on the tax rolls, 25 percent said form an extension association with everyone who belongs paying a fee, 13 percent said voluntary contributions, and 13 percent gave other responses.

A number of farmers who were enthusiastic about the township approach did not want to see the financing accomplished through taxation because then the program had to be available to everybody, and they were afraid the agent would be spread too thin.

Near the end of the experimental period, several of the township extension association boards expressed willingness to continue the program on a membership basis which would contribute about one-fourth of the total cost of operating the program.

The question had to be faced as to whether the extension administration could sanction a system in which the Extension Service paid three-fourths of the cost, the local people paid one-fourth, and the local farmers controlled the program and limited the agent's work to a small group of farmers.

The state extension director rejected the idea of an extension association with extension's services available only to those who paid a fee, under a system in which the fees covered a fraction of the cost and the remainder came from public appropriations. He suggested that farmers who wanted special continuing help could form a non-extension association and hire their own advisor. The township agents expressed considerable doubt as to whether they, or other extension agents, would be willing to give up their position with the Extension Service, and its related benefits, for what appeared to them to be a more precarious type of employment. With the trend toward farmers paying for more services, it may be that at some time in the future more farmers will band together to hire their own technicians or advisors.

The possibility of any one township supporting extension on a continuing basis appears quite remote, for reasons that will be discussed in a later section of this report.

Even though several groups of townships expressed interest in going together to support the work of a special agent for their townships, this possibility was not very thoroughly explored or promoted. On the one hand, some farmers who had experience with a township agent were concerned with spreading the agent too thin if he covered two or more townships. On the other hand, a powerful deterring force was the necessity of putting the proposal (and usually the millage to support it) to a vote. If the vote failed in any township in the group, the other townships would have to start over again and either find another township or vote a higher millage. This possibility made the Odessa group decide against going in with two neighboring townships that wanted to join with them at the end of the experimental period.

While the idea of obtaining financial support for extension work from taxation at township and municipal levels is commendable, it would appear that institutional and political forces will prevent its accomplishment on any widespread basis. Financial support for all kinds of extension programs, including intensive approaches such as the township program, will probably have to be obtained from some combination of federal, state and county financing, plus fees from farmers where extension administrators consider this approach consistent with Extension Service objectives on either a temporary or permanent basis.

Conclusions Regarding Organization

Organization at the State Level

It is apparent that a full time administrator is not needed to coordinate the work of five extension agents on a continuing basis. However, there was considerable work demanded of the project coordinator in getting the new program established and operating. Special intensive programs of substantial nature, such as farm and home development programs and resource development projects, will usually find the push given by at least a special part-time coordinator at the state level necessary to establish the program and keep it going.

In the township program, there was a significant shift in the way the agents used state extension specialists. While the township agents continued to use specialists to keep up-to-date on new developments, the biggest shift was toward using specialists for training in techniques of handling problems the agents did not feel capable of handling. The training typically was accomplished by the agent having a specialist out for a day to visit a limited number of farms which had problems in the specialist's area of competence. The specialists helped solve the farmers' problems and at the same time gave the agents insights into how to handle similar problems. Through this approach, the township agents developed the ability to handle many of the problems that county extension agents frequently refer to specialists.

If a new intensive program utilized inexperienced agents, more specialist help would be needed to train the agents than was the case in the township program. Much of the specialist help should be provided in the early phases of the program. For example, the township agents used nearly 40 percent of the five-year total specialist time in the second year of the program; by the second year they had their programs well underway and were running into a number of problems on which they needed help.

Organization at the County Level

The township agents, while nominally members of the county extension staffs in the counties, really operated as autonomous agents. Because of the nature of their assignments and the personalities involved, this worked out satisfactorily for the most part. On a continuing basis a more satisfactory arrangement would be to tie them in more closely with the rest of the county staff Special agents, however, need to be protected from too many county-wide extension "chores" so that they can do the job for which they were hired.

One of the reasons for the favorable results attained in the experiment was that the township agents were given a full-time special assignment which permitted them to develop the necessary skills and left them enough freedom to do their jobs.

Organization at the Local Level

One of the strong points of the organization and operation of the township program was the formation of the township extension associations and the effective use the township agents made of their elected farmer boards of directors and committees (10, p. 18).

Area Covered by One Agent

One of the significant reasons that the township program produced as much change on farms as it did was concentration of effort in a small area. Since agents were close at hand farmers called on them more often than they would have under the county extension system. Also, the agents frequently followed up farmers' requests where county extension agents would not have been able to do so. In effect the program brought the Extension Service closer to farmers. Perhaps of even greater importance was the spirit of change brought about among the farm people within the township areas. Many farmers became imbued with a philosophy of change which led other farmers to make changes. This spirit of group change came about partly because of the agents' concentration on a relatively homogeneous type of farming and homogeneous group of farmers, and partly because of the close proximity of the farmers to each other.

On the other hand, a township is not necessarily a natural unit in which to do extension work inasmuch as the farm people within the township may be members of different community groups. Extension work on an intensive basis might be more effective if it were organized around natural communities, shopping centers, or school districts.

In spite of the factors just mentioned, the number of farmers per agent is probably more important than their geographical location; considering the availability of rapid and relatively economical transportation and communication. At the end of the experiment, the township agents expressed the belief that the ideal organization for intensive on-the-farm extension work would be for one agent to cover one-fourth to one-half of a county and to work with all the cooperators who were interested in participating in this type of program.

Rotating Farmer Clientele

It is doubtful if extension will ever have the resources to work intensively with the same group of farmers over long periods of time. At the conclusion of the township experiment a number of farmers mentioned that they had received all the extension help that they needed for awhile, and would prefer to concentrate on putting the advice and information they had received into use. (On the other hand some farmers said it was important to keep their special agent to help keep them up to date on new things and give them a "push.")

It would be consistent with extension's educational objectives to work intensively with farm families for two to five years, then move on to work with other farmers. The extension program would likely be of greatest benefit if it concentrated on younger farmers and emphasized basic education or teaching management processes rather than concentrating more heavily on providing either technical or economic information.

As a result of his experience with the association approach, the Newton township agent concluded that having farmers in an intensive program for three years would be best, and that there should be a turnover of about one-third of the farmers each year. Under his proposal, the first year would be devoted to studying and observing the farm business. The second year would be concentrated on detailed analysis and planning. The third year would be concentrated primarily on follow-up work.

What Kinds of Farmers or Areas Would Produce Greatest Response?

Given the objectives of the township program, the analysis of relationships among variables reported earlier in this bulletin gives some indications about the kinds of farmers who responded most to the program. If one were setting up an intensive program so as to show maximum results, the kind of area or clientele selected would depend in large measure on the results being sought. If the results related primarily to farm output increases, one would seek an area in which there were sufficient high-quality land and other resources to support the expansion. If the objectives related to helping people most in need of help, one would concentrate in areas of low farm income. Further, one would select individual families rather than concentrating on all farm people in an area.

Generalized Versus Specialized Agents

A number of agricultural leaders, farmers and extension administrators have noted the difficulty that general extension agents have in keeping up to date in a number of subject-matter areas and of serving the needs of different types of highly specialized farmers. Often agents are not able to serve the needs of specialized farmers and are bypassed in favor of technicians and advisors who can provide more specialized help.

To obtain farmers' views on the type of extension agents needed, respondents on the terminal survey were asked, "If one more extension agent were alloted to your county, what kind of assignment would you like to see him have?" Responses to the structured question are summarized below:

	Percent of farmers	
	Experimental	Control
General agricultural work throughout the county	50	53
Work with all farmers in one part of the county	22	8
Work with farmers of a specialized type	24	21
Don't know	4	18
Total	100	100

As farms continue to become more highly specialized, farmers will very likely demand help from more highly trained and more highly specialized extension personnel. This will probably result in more specialists being added to county extension staffs as has been done in a number of states already. In some cases it will be more feasible to assign the county specialists to two or more counties.

A number of extension administrators and some extension agents have been enthusiastic about the farm and home development or management approach to extension work. A useful approach might be to employ county agents whose management specialties are applicable to the types of farms that predominate in the area; such specialists would have knowledge and ability on commodity production as well as organization and management of a particular type of farm. They could work with other functional specialists and commodity specialists at the county level, when needed.

Conclusions Regarding Techniques

Establishing an Intensive Program in a New Area

When the township agents arrived in their townships, they faced a wide range of farmer reaction to the experimental program. In each experimental area, there was a nucleus of enthusiastic extension supporters. However, in every area there also were some farmers who had not yet heard about the program and others who had heard about it, but were indifferent toward it. In Denmark, Almont and Odessa there were a number of farmers who made it clear that they believed they did not need the help of the township agent.

To gain insight into their motivations, farmers in the experimental samples who had participated in the program were asked on both the intermediate and terminal surveys why they decided to participate. The evidence indicates that, especially at the beginning, few farmers had strong specific motives which led them to participate in the program. Many were either not sure of the benefits which could be derived through participation, or had broad, general types of reasons for participating. Such motivation would not be expected to lead to high participation.

Early in the program, agents carried out various activities to gain acceptance for themselves and their programs. For example, the Newton agent organized two farm and home planning groups, with an important objective being to get acquainted and establish himself with farmers. The Almont agent prepared a series of news articles designed specifically to stimulate farmers' interest in good farming practices, but also calculated to stir up interest in the program. The Odessa agent encouraged his board to set up a number of committees. The committees and activities were generated partly to bring about changes on farms; but an underlying reason for forming them was to let people know about the program, to get a number of people actively involved, and to build up interest for the following year.

The Newton and Tri-Township agents made a round of visits to the farmers in their areas early in the program. The Denmark, Almont and Odessa agents initially visited farmers who were easy to reach, such as those on the boards or those who had taken the initiative to indicate interest in the program. The purposes of the early visits were to get acquainted; to explain the program; and to obtain information about the farm families, their goals, and their farm businesses. Later in the first year, the Tri-Township, Denmark and Odessa agents put forth concentrated efforts to contact farmers in their townships.

The township agents agreed that it took from one and one-half to two years to get the program launched. It took about this much time to gain the confidence of sufficient numbers of farm people to make work on basic problems possible.

Following the initial launching period during which they exerted considerable effort to induce farmers to participate in the program, the township agents continued activities designed to reach farmers who had not participated and to push cooperators to higher levels of participation. New members were brought into the Newton association primarily through personal contact work by association board members. The Newton agent felt that the demonstrations which were a part of the township program played an important part in influencing some farmers to join the association.

The Tri-Township agent used personal-service work as a means of gaining acceptance by some farmers who had previously had little or no contact with extension. Probably the activity that opened more doors for the Denmark agent than anything else was his mixing socially with the people in the township; he did the calling at square dances, helped put on chicken barbecues, and attended parties and other events.

Throughout the second year, and continuing into the third year, the early activities and contacts with farmers began to pay off. Substantial numbers of farmers could be counted in the cooperator column for the first time. In all areas, a crucial factor in a number of farmers' decisions to participate was their observation of results attained by participating farmers, or by their being favorably impressed with the results of their first, tentative request to the agents for help.

By the latter part of the second year of the program, the township agents had reached all of the farmers who were receptive to extension work, and a number who initially had been indifferent to the program. During the third and fourth years they were successful in reaching more of the farmers who had been indifferent and also reached some who had opposed the program earlier. The Tri-Township agent reached essentially all of the farmers in his area by the end of the fourth year. Throughout the five years the Almont agent continued in his efforts to reach as many farmers in his township as possible.

By the early part of the fourth year, the Odessa agent concluded that those who had not been induced to participate in the program probably never would; the Denmark agent arrived at the same conclusion for his area late in the fourth year. Once they had arrived at this conclusion, these agents no longer exerted direct effort to bring more farmers into the program.

Very few farmers were reached for the first time by the program during the fifth year of the program. The Odessa agent reported that some farmers who previously had nothing to do with the program participated in the series of winter meetings he conducted in the fourth and fifth years.

By the end of the experiment, the township agents had chalked up the rather substantial accomplishment of having reached 81 percent of the farmers in their townships (exclusive of Newton where the agent worked with all members of the association). "Reached" in the sense used here involves some face-to-face contact of agent and farmer, such as the agent visiting the farm or the farmer attending the agent's meetings or visiting his office. While farmers' participation in the county extension program prior to the experiment served as a good predictor of their participation in the township program, it is significant that the township agents reached certain hard-to-reach farmers who had never before participated in extension activities.

Starting from similar benchmark levels at the beginning of the program, the average level of extension participation of experimental farmers was raised to three times the level of control farmers by the terminal year (as measured by extension participation indexes). Control farmers' participation in county extension programs generally declined during the period.

The differential increase in personal contact type of extension participation was particularly noteworthy. The percentage of farmers receiving one or more farm visits per year from the extension agent increased from 40 to 89 in the experimental areas while it decreased from 39 to 34 in the control areas during the experimental period. The average number of farm visits per farmer in the experimental sample in the terminal year was 7.8 and in the control sample 1.2.[9]

On the terminal survey, farmers were asked to identify the most important decision they had made in connection with their farm business during the previous two years. Subsequent questions on sources of information and advice were asked in relation to the decision specified. Thirty-two percent of the experimental farmers said they sought the advice of their township agent before making the decision, whereas 4 percent of the control farmers said they sought advice from a county extension agent. Under the county extension program, farmers looked primarily to other sources for information needed in farm decision making, and made only limited use of the Extension Service for this purpose. Under the intensive township extension program, farmers still made considerable use of other information sources; but they looked to extension for information to use in major decisions far more frequently than farmers who had access to a county extension program only. Under the township program particularly, farmers looked to extension for kinds of information and advice that are not generally available from other sources—such as appraisal of the impact of a change on the whole farm business.

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[9] While high average levels of farmer participation in the township program were attained, there was a wide range among farmers in the extent to which they participated in the program. An attempt was made to identify the program, personal, situational and other factors which were associated with the various levels of participation. For details see (10).

The research indicated that more farmers could have been reached and higher levels of participation attained if the agents had called on every farmer in the experimental areas and persisted with follow-up contacts. Some of the township agents and county extension directors believed that the township agents could have reached every farmer in time while others had doubts. All agreed that accomplishing such an objective would be a high-cost operation.

Analysis of the relationship between knowledge of the program and participation in it indicated that there was a close association between farmers' knowledge of the township program *activities* and their participation in them. The relationship between knowledge of program *organization* and participation was even stronger. The strength of the relationship between knowledge of the program and participation in it suggests the importance of a carefully designed plan for informing farm people about a new program. In this case, perhaps a clearer conception of the program on the part of the township agents would have been the first step.

More time spent in explaining and promoting the program might have paid dividends in terms of faster acceptance. The importance of informing farmers about how the program was organized may have been overlooked. Apparently, when farmers understand how a program is organized and feel that they have a voice in how it is run, they participate more enthusiastically.

One of the strong points that helped the township agents in establishing and conducting their programs was the extent to which they studied the agriculture and the people in the area to which they were assigned, and then took account of the community characteristics in designing the kind of program which they thought would be most acceptable and most helpful to the people. They also did a notably good job of taking individual farmer differences into account, and tailored their efforts to motivate and to meet the needs of different kinds of farmers.

The township agents, especially the Almont agent, exerted efforts to locate and work through community leaders in establishing and conducting their programs. All of the township agents made effective use of their elected farmer boards of directors in conducting their programs.

On the other hand, the township agents' use of farmer demonstrators worked to their disadvantage to some extent. The farmers used as demonstrators were frequently effective in disseminating ideas and information. But a number of other farmers in the townships became disturbed when they observed the agents spend so much time with these farmers. Relatively speaking, some farmers felt neglected. Worse yet, some felt that the agent did not classify them as "good" or "leading" farmers.

Some reacted by becoming less active in the program, and some farmers who were on the sidelines might have been brought into the program more easily had it not been for this reaction. The reaction was no doubt intensified because of the close proximity among the farmers making up the township agents' clientele. The situation might have been helped by picking farmers who were more acceptable as demonstrators, by more subtle use of the farm leaders, or by a better information program to inform farmers of the agents' objectives.

Working Intensively with Farmers

To determine the extent to which the agents changed their extension techniques when they shifted to the intensive program, comparisons were made of the activities they conducted before and after they became township agents. Summaries of activities were obtained for the township agents for the last full year they served as county agricultural agents. This information was compared with the data for the same agents for the second year of the program after they had had an opportunity to establish their programs. On an annual basis, this comparison showed the following average changes for the agents who shifted from county to township agent positions:

1. The number of days spent in the field increased from 176 to 205.
2. The number of farm and home visits increased from 571 to 762. Since the number of farms in the extension area served by the agents decreased, the number of visits per farm increased dramatically.
3. The agents wrote about the same number of circular letters.
4. The number of office calls decreased from 1,846 to 456.
5. The number of telephone calls decreased from 2,046 to 921.
6. The number of news articles prepared decreased from 215 to 19.
7. The number of radio broadcasts decreased from 40 to 2.

Starting from an intensification of the traditional county agricultural extension approach, the township experiment evolved into a program which placed primary emphasis on farm analysis and planning in three of the five experimental areas, and to a lesser extent, in a fourth area. There was evidence that the township program brought about improvement in the managerial ability of some farmers; the improvement for the most part was brought about indirectly through the farm analysis and planning work.

The administrator who served as state extension director throughout most of the experimental period argues that if you put an extension agent in close contact with farmers, he will sooner or later come to use the farm and home development approach whether you tell him to or not. He believes that on the one hand, close association with farmers and their problems will lead an agent in this direction regardless of his background, inclinations and training, and on the other hand if the agent is slow in coming to this approach farmers will force him in that direction through the problems they present. The director argued that the township program was one of a number of examples which proved the validity of the concept.

In the observations of the program evaluator, the outcome suggested is possible, but by no means a certain one. Among other possible outcomes is the tendency for some extension agents working closely with farmers to spend more and more of their time on personal-service activities. In any case, the farm analysis and planning work conducted by the township agents would have had more lasting value if the agents had gone through more of the analysis process with the farmers rather than doing so much of it by themselves, and if the agents had made a more conscious attempt to teach farmers how to analyze and plan for themselves.

The amount of agent time available per farm and the continuity of contact led to a depth of a farmer-agent involvement never before experienced by either the farmers or the agents. All of the township agents established close personal relationships with a number of farmers in their townships. In some cases the frequent contact and close personal relationships between agent and farmer resulted in farmers learning how to become better managers.

In other cases, the opposite outcome appears to have resulted. Some farmers became increasingly dependent on the agents, and hesitated to make even small decisions connected with their farm business without consulting the agents. This phenomenon was reported by both agents and farmers. On the terminal survey, some farmers said that the township agent had given them so much detailed specific advice and followed them so closely that they came to depend on the agent to tell them what to do. A few said specifically that their power to take information and make decisions for themselves had decreased as a result of the township program.

The extent to which farmers became dependent on the agent depended to a large extent on the approach used by the agent. Where the agent conceived his role as one of getting changes made on farms and pursued this objective aggressively, more farmers were apt to become dependent on him. The higher the frequency of farmer-agent contact, the greater the likelihood of the farmer becoming dependent on the agent.

However, the personality and initiative of the farmer appears also to be a crucial factor. For example, the Odessa township agent generally followed the approach of presenting information and analyses without making strong individual recommendations to farmers. The result was that the more progressive farmers were pleased with the program. Some of the less progressive, on the other hand, expressed disappointment and indicated that the program would have been more useful to them if the agent had made more definite recommendations. (Some very progressive farmers, on the other hand, indicated that they liked to have specific recommendations from the extension agent—which they would then consider and feel free to accept, reject or modify.)

The township agents developed the ability to answer most questions out of their heads. Unfortunately, in this day of highly complex and rapidly changing technology, many farmers still expect agents to answer all questions without reference to printed material. There are signs that this attitude may be changing.

Problems of working intensively and closely with farm people included their demand for very specific information, and wanting information on new things not yet recommended by the Experiment Station. Another was the tendency of farmers to bring serious personal and family problems to the agent. Under these circumstances, it becomes increasingly important for extension agents to develop the ability to sense when it is appropriate to attempt to help farm families and when it is more appropriate to withdraw and advise the family to seek the help of an attorney, clergyman or other professional counselors.

Farmers' and Agents' Satisfactions With the Program

Evaluating the attitudes of farmers and agents toward the intensive program was one of the four secondary objectives of the experiment. What people think and feel has an important influence on their behavior. Farmers' and agents' attitudes at any point during the five-year experimental period influenced the progress made during the remainder of the period. Their attitudes at the end of the experiment would have an important influence on continuing or expanding similar programs.

Farmers' Satisfactions with the Program

How helpful farmers thought the program was—At the end of the experiment, in response to a structured (check-type) question, 46 percent of the farmers in the experimental samples thought their townships were "much better off" and 41 percent thought their townships were "somewhat better off" as a result of having the program.

Fifty percent said the program was "very helpful" to them personally, and 32 percent that the program was "somewhat helpful."

Farmers thought the program was most helpful in bringing about adoption of new practices or new ways of doing things, increasing farm income or efficiency, increasing crop yields, providing information and ideas, and speeding up the process of getting information to farmers.

Kinds of participation farmers found most helpful—The township agents built their programs around individual contacts with farmers. By the end of the fifth year, 49 percent of the farmers in the experimental samples said that farm visits had been the most helpful kind of extension participation; only 4 percent of the farmers in the control samples, who were served by county extension programs, gave similar ratings to farm visits. Farmers in the control samples generally found meetings and office calls the most helpful kind of contact they had had with extension.

By the end of the experiment, 46 percent of the farmers in the experimental samples said they had received individual help from the township agent on farm analysis and planning, as compared to 5 percent of the control samples who said they had received similar help from a county extension agent. Seventy-three percent of the experimental farmers who had participated in individual farm analysis with the township agent rated it as "much help."

How much farmers would pay to have the program continued— In response to a check-type question, 41 percent of the farmers in the experimental sample said they would pay $40 or more per year to see the program continued at the end of the five years if the costs were put on the tax rolls, and 50 percent said they would pay $40 or more if some other system of financing were used.

The amounts stated ranged up to $1,000 per year. A number specifically mentioned that they would be willing to pay more than they had contributed during the experimental period. Seventeen percent said they would pay nothing if the program were put on the tax rolls and 11 percent said they would pay nothing under other systems of financing.

Factors related to farmers' appraisals—Variables related to farmers' appraisals of the township program (experimental areas) and of the county extension program (control areas) were analyzed. The highlights from these analyses are summarized in percentage terms and reported in Tables 14, 15 and 16. Table 14 reports variables related to experimental farmers' ratings of how helpful the township program had been to them and Table 15 gives similar information on control farmers' ratings of extension. Table 16 shows variables related to how much experimental farmers said they would be willing to pay to see the township program continued.[10]

In addition to the variables shown in the tables, the analysis indicated that the experimental farmers who had made the greatest *increases* in total PMWU, animal units, total farm practice adoption, net earnings and net worth rated the program highest; in the control sample, none of the change variables showed a statistically significant relationship to farmers' appraisals of extension.

In regard to kinds of help farmers said they had received from the program, those who had received help on kinds and acres of crops to grow, kinds and numbers of livestock to have, and overall analysis and planning of the farm business particularly rated the program as most helpful and expressed willingness to pay larger amounts to have the program continued.

Agents' Satisfaction with the Program

Cycles in the township agents' work load—All of the township agents moved into the job from positions as county extension directors.

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[10] Chi square analyses were applied to contingency tables showing frequency distributions in actual numbers. The number of observations were 148 for the experimental sample and 163 for the control.

TABLE 14. Variables related to farmers' ratings of how helpful the township program had been to them, experimental sample.

Variable	Description of relationship	Significance level
Clearness of farm goal formulation	Of farmers with goals most clearly formulated, 65% rated the program very helpful and 8% not very or not at all helpful; of those with goals least clearly formulated, 51% rated the program very helpful and 27% not very or not at all helpful.	.10
Clearness of family goal orientation	Of farmers with goals most clearly formulated, 63% rated the program very helpful and 5% not very or not at all helpful; of farmers with goals least clearly formulated, 30% rated the program very helpful and 32% not very or not at all helpful.	.05
Attitude toward future in farming	Of farmers who felt their opportunities in farming were increasing, 64% rated the program very helpful and 5% not very or not at all helpful; of those who felt their opportunities were decreasing, 35% rated the program very helpful and 27% not very or not at all helpful.	.01
Attitude toward the role of science in agriculture	Of farmers who considered agricultural research very important in operating their farm, 68% rated the program very helpful and 8% not very or not at all helpful; of those who considered research not important, 26% rated the program very helpful and 48% not very or not at all helpful.	.01
Attitude toward the use of credit	Of farmers who had most favorable attitude toward use of credit, 54% rated the program very helpful and 11% not very or not at all helpful; of those with least favorable attitude toward credit, 26% rated the program very helpful and 53% not very or not at all helpful.	.01
Attitude toward future extension work	Of farmers who thought there should be more extension work with farmers, 57% rated the program very helpful and 12% not very or not at all helpful; of those who thought there should be less extension work, 39% rated the program very helpful and 30% not very or not at all helpful.	.05
Formal participation score	Of farmers with scores of 25 or more, 61% rated the program very helpful and 6% not very or not at all helpful; of those with scores less than 10, 29% rated the program very helpful and 35% not very or not at all helpful.	.01
Motivation for participating in the program	Of farmers who decided to participate to get help in increasing income or level of living, 67% rated the program very helpful and none rated it not very or not at all helpful; of those who participated to get help on farm analysis, 54% rated the program very helpful and 4% not very or not at all helpful; of those who participated to get information in general, 41% rated the program very helpful and 18% not very or not at all helpful; of those	

	who weren't sure why they decided to participate or participated very little, 25% rated the program very helpful and 42% not very or not at all helpful.	.01
Change in total farm practice adoption score 1953-58	Of farmers who increased 20 points or more, 56% rated the program very helpful and 15% not very or not at all helpful; of those who increased less than 20 points, 42% rated the program very helpful and 24% not very or not at all helpful.	.05
Extension activities and events score	Of farmers with scores of 8 or more, 83% rated the program very helpful and 5% not very or not at all helpful; of those with scores less than 3, 27% rated the program very helpful and 42% not very or not at all helpful.	.01
Extension individual contact score	Of farmers with scores of 30 or more, 87% rated the program very helpful and 3% not very or not at all helpful; of those with scores from 10 to 29, 59% rated the program very helpful and 5% not very or not at all helpful; of those with scores less than 10, 13% rated the program very helpful and 48% not very or not at all helpful.	.01
Total extension participation score	Of farmers with scores of 200 or more, 82% rated the program very helpful and none not very or not at all helpful; of those with scores from 120 to 199, 49% rated the program very helpful and 10% not very or not at all helpful; of those with scores less than 120, 24% rated the program very helpful and 43% not very or not at all helpful.	.01
How much farmer would be willing to pay to see the township program continued in his area	Of farmers who would pay $60 or more, 80% rated the program very helpful and none not very or not at all helpful; of those who would pay $20-39, 48% rated the program very helpful and 16% not very or not at all helpful; of those who would pay nothing, none rated the program very helpful and 88% not very or not at all helpful.	.01
How strongly farmer would recommend setting up township program in a new area	Of farmers who would give unqualified encouragement, 69% rated the program very helpful and 4% not very or not at all helpful; of those who would discourage, 6% rated the program very helpful and 81% not very or not at all helpful.	.01

As county directors, they faced a constant stream of office visitors, an incessantly ringing telephone, many organizations to work with, meetings to hold, and two to four professional colleagues to consult with.

Once on the job as township agents, the complexion of things changed radically. Only a handful of farmers in each area had a clear notion of what the new agent could do for them. Three of the agents moved into make-shift offices with no professional colleagues and at best only a part-time secretary. There was little mail, few telephone calls, and almost no farm visitors.

During the early months on the job, the township agents spent some time thinking about plans and procedures and getting acquainted

TABLE 15. Variables related to farmers' ratings of how helpful extension had been to them, control sample.

Variable	Description of relationship	Significance level
Clearness of farm goal formulation	Of the farmers with goals most clearly formulated, none rated extension very helpful and 17% not very or not at all helpful; of those with goals least clearly formulated, 20% rated extension very helpful and 36% not very or not at all helpful.	.10
Attitude toward future in farming	Of farmers who felt their opportunities in farming were increasing, 31% rated extension very helpful and 10% not very or not at all helpful; of those who felt opportunities were decreasing, 18% rated extension very helpful and 40% not very or not at all helpful.	.01
Attitude toward role of science in agriculture	Of farmers who considered agricultural research most important, 40% rated extension very helpful and 28% not very or not at all helpful; of those who did not consider research important, 14% rated extension very helpful and 50% not very or not at all helpful.	.01
Attitude toward the use of credit	Of farmers with most favorable attitude toward the use of credit, 26% rated extension very helpful and 23% not very or not at all helpful; of those with least favorable attitudes, 13% rated extension very helpful and 57% not very or not at all helpful.	.10
Attitude toward future extension work	Of farmers who thought extension should work more with farmers, 24% rated extension very helpful and 18% not very or not at all helpful; of those who thought extension should do less work with farmers, 22% rated extension very helpful and 42% not very or not at all helpful.	.01
Formal participation score 1958	Of farmers with scores of 25 or more, 37% rated extension very helpful and 10% not very or not at all helpful; of those with scores less than 10, 16% rated extension very helpful and 46% not very or not at all helpful.	.05
Extension reading and listening score 1955-58	Of farmers with scores of 60 or more, 39% rated extension very helpful and 15% not very or not at all helpful; of those with scores less than 20, 12% rated extension very helpful and 55% not very or not at all helpful.	.01
Extension activities and events score 1955-58	Of farmers with scores of 4 or more, 33% rated extension very helpful and 17% not very or not at all helpful; of farmers with scores of 0, 12% rated extension very helpful and 52% not very or not at all helpful.	.05
Extension individual contact score	Of farmers with scores of 6 or more, 42% rated extension very helpful and 7% not very or not at all helpful; of those with scores of 0, 8% rated extension very helpful and 13% not very or not at all helpful.	.01

Total extension participation score 1955-58	Of farmers with scores of 90 or more, 49% rated extension very helpful and 12% not very or not at all helpful; of those with scores of 30-89, 14% rated extension very helpful and 20% not very or not at all helpful; of those with scores less than 30, 8% rated extension very helpful and 68% not very or not at all helpful.	.01

with the people and the agriculture in the township. Some of them spent some time catching up on reading. They put out information, and worked with a number of farmers who were willing to be helped with uninvolved things like farm practices. For agents who had been used to going at the pace of county extension agents, not being pushed for work was in fact a frustration rather than a relief.

After about a year and a half on the job, the agents built up sufficient rapport with enough farmers that they were kept busy with educational activities, as opposed to organizational activities. More farmers called on them for help, and they were able to probe into more facets of the farm business with the early cooperators.

From the middle of the second year on into the early part of the fourth year, the agents all put in long hard hours on the job and their monthly reports frequently contained statements such as, "There are so many requests for help on the farm that it is impossible to keep office hours or even show up at the office."

In the early part of the fourth year of the program, the agents' work load cycle took another turn. The earliest and most cooperative farmers had been provided much intensive help, and did not need so much of the agents' time. New cooperators were hard to come by. The agents took care of a steady but less demanding flow of requests for help from farmers, followed up on farms previously worked on, and devoted a certain amount of effort to trying to reach new cooperators.

The Odessa and Denmark agents expressed the feeling of having an inadequate work load during the last two years of the experiment. While the township agents worked hard and kept busy one way or another, they generally indicated that they worked harder as county extension agents than as township agents.

In capsule form, the township program went through the following stages: 1. conception; 2. appointment of a project coordinator, selecting the township experimental areas, and recruiting the agents; 3. establishment period; 4. operating period; and 5. tapering off and closing out.

TABLE 16. Variables related to how much farmers said they would be willing to pay to see the township program continued, experimental sample.

Variable	Description of relationship	Significance level
Attitude toward future in farming	Of farmers who felt their opportunities in farming were increasing, 4% would pay nothing, 27% \$1-39, 20% \$40-59 and 49% \$60 or more; of farmers who felt their opportunities were decreasing, 24% would pay nothing, 38% \$1-39, 27% \$40-59 and 11% \$60 or more.	.05
Attitude toward role of science in agriculture	Of farmers who considered agricultural research very important, 5% would pay nothing, 28% \$1-39, 25% \$40-59 and 42% \$60 or more; of those who did not consider research important, 40% would pay nothing, 26% \$1-39, 17% \$40-59 and 17% \$60 or more.	.01
Attitude toward future extension work	Of farmers who thought extension should do more work with farmers, 6% would pay nothing, 29% \$1-39, 27% \$40-59 and 38% \$60 or more; of those who thought extension should do less work with farmers, 35% would pay nothing, 32% \$1-39, 13% \$40-59 and 20% \$60 or more.	.01
Months worked off farm	Of farmers who worked off farm 3 months or more, 19% would pay nothing, 43% \$1-39, 30% \$40-59 and 8% \$60 or more; of those who worked off farm less than 3 months, 18% would pay nothing, 26% \$1-39, 18% \$40-59 and 38% \$60 or more.	.05
Total farm capital investment 1958	Of farmers with \$80,000 or more capital investment, 15% would pay nothing, 18% \$1-39, 23% \$40-59 and 44% \$60 or more; of those with less than \$30,000, 16% would pay nothing, 50% \$1-39, 19% \$40-59 and 15% \$60 or more.	.10
Net farm earnings 1958	Of farmers with \$10,000 or more, 13% would pay nothing, 17% \$1-39, 27% \$40-59, 43% \$60 or more; of those with \$4,000 to \$9,999, 12% would pay nothing, 27% \$1-39, 20% \$40-59 and 41% \$60 or more; of those with less than \$2,000, 22% would pay nothing, 47% \$1-39, 19% \$40-59 and 12% \$60 or more.	.10
Formal participation score 1958	Of farmers with scores of 25 or more, 6% would pay nothing, 12% \$1-39, 22% \$40-59 and 60% \$60 or more; of those with scores less than 10, 26% would pay nothing, 47% \$1-39, 18% \$40-59 and 9% \$60 or more.	.01
Motivation for participating in the program	Of farmers who decided to participate in the program to get help in increasing income or level of living, none would pay nothing, 28% \$1-39, 24% \$40-59 and 48% \$60 or more; of those who participated to get help on farm analysis, 5% would pay nothing, 33% \$1-39, 25% \$40-59 and 37% \$60	

	or more; of those who joined to get information in general, 21% would pay nothing, 35% $1-39, 29% $40-59 and 15% $60 or more; of those who weren't sure why they decided to participate or participated very little, 46% would pay nothing, 19% $1-39, 16% $40-59 and 19% $60 or more.	.01
Extension reading and listening score, 1955-58	Of farmers with scores of 90 or more, 16% would pay nothing, 20% $1-39, 16% $40-59 and 48% $60 or more; of those with scores less than 30, 42% would pay nothing, 50% $1-39, 8% $40-59 and none $60 or more.	.01
Extension activities and events score 1955-58	Of farmers with scores of 8 or more, 10% would pay nothing, 18% $1-39, 22% $40-59 and 50% $60 or more; of those with scores less than 3, 28% would pay nothing, 39% $1-39, 24% $40-59 and 9% $60 or more.	.01
Extension individual contact score 1955-58	Of farmers with scores of 30 or more, 12% would pay nothing, 12% $1-39, 18% $40-59 and 58% $60 or more; of those with scores less than 10, 35% would pay nothing, 42% $1-39, 19% $40-59 and 4% $60 or more.	01
Total extension participation score 1955-58	Of farmers with scores of 200 or more, 9% would pay nothing, 14% $1-39, 16% $40-59 and 61% $60 or more; of those with scores less than 120, 28% would pay nothing, 50% $1-39, 20% $40-59 and 2% $60 or more.	.01
How strongly farmer would recommend setting up township program in a new area	Of farmers who would give unqualified encouragement, none would pay nothing, 33% $1-39, 23% $40-59 and 44% $60 or more; of those who would discourage, 62% would pay nothing, 13% $1-39, 25% $40-59 and none $60 or more.	.01

The stresses—At the beginning, the township agents faced all the stresses that would be encountered by any extension agent assigned to a new area—establishing new homes, gaining new friends for themselves and their families, and establishing themselves with a new clientele. But because of the newness of the program and its experimental nature, the township agents were probably more on the spot than most extension agents. The new program had been announced in blazing headlines in many of the papers and magazines in the state, and in every major national farm magazine. The agents felt that the spotlight was shining on them so brightly that they had to succeed somehow or other.

But how to go about succeeding was another question. No one had ever done extension work on a township basis before, so there was no precedent to go by. By design, the agents were left free to outline their own programs, and all of them felt confident of success.

But after a few months on the job, the agents generally had a feeling of frustration stemming largely from doubts as to which approach was best in the new situation. Some wished that general procedures could have been outlined more clearly. They found the administrative and supervisory staff sympathetic, but not particularly helpful.

After the first year and a half, the agents felt less keenly the lack of direction; this was probably due to their involvement with many farmers, and also to the help received from the farm management specialist. Throughout the program, however, the agents mentioned that it was easy to keep busy, but they were not always sure they were doing the most effective things.

When the program was announced, the state extension director stated that the five outstanding county agricultural agents in the state had been selected for the job. This caused resentment from the other agents and set them apart from the other extension agricultural agents, a resentment which the township agents felt and were disturbed by. The feeling of being set apart was further heightened by the arrangement under which three of the township agents had offices in their townships rather than in the county extension office, and by all five having programs which were largely divorced from the rest of the county extension program.

While the agents accepted it as part of their job to lead farmers to participate in the program, the process of "selling" themselves and the program was sometimes a trying experience. In some cases, farmers who were opposed to the program turned their backs to the road when the agent drove by, and others told the township agent they didn't need him because they could read the farm magazines just as well as he could. In time, the agents' efforts to bring more people into the program became hard work and an emotional strain. Some of the agents found the task so difficult and demoralizing that after awhile they shifted concentration from trying to bring new cooperators into the program.

In their work with farmers, the township agents were very much on the spot. They spent most of their time in close contact with farmers. Farmers asked specific questions and expected specific answers—immediately, on the spot, and without looking it up.

As a county extension agent it was usually sufficient to tell farmers that 200 pounds of a certain analysis of fertilizer was generally recommended for corn in the county. But the township agent found himself standing on a field of Miami silt loam. The farmer told him that he had grown corn on the field for the past two years. He'd top dressed it with 10 loads of manure. He had other uses for his limited capital. Then he asked exactly how much and what kind of fertilizer he should put on this field under these circumstances this year.

A number of farmers unloaded personal, family and financial problems on the township agents—problems the agents couldn't forget about after they went home at night. In the fourth year of the program, one township agent said that he had never before been so close to things, and that as a matter of fact, it was not always a comfortable feeling. Another commented that he still got scared sometimes working with farmers.

The township agents who lived in the townships were particularly on the spot. One of the township agents commented, for example, "Being a township agent is a tougher job than being a county agent. There is no place to hide. It's hard to spend two days out of the township without having somebody say something." The agents were probably oversensitive on these points, but it does illustrate one of the stresses they felt.

Before the agents had been in the townships a year, they began to receive requests from the extension administrative staff for "success" stories. The farm press regularly contacted the agents for progress reports and stories which would indicate the success of the venture. Especially early in the program, the township agents were in no position to provide "success" stories in such a short period of time, and most of them realized it. They did the best they could to honor the requests, however, even if it meant reporting small or partial accomplishments, or stretching a point a little.

Throughout the five-year period, a stream of inquisitive visitors from all parts of the country and a number of foreign countries visited the townships to see what the agents were doing and probe for evidences of results. The township agents sometimes felt honored by the requests, sometimes pleased because it gave them something to do when they weren't too busy, and sometimes annoyed because it took valuable time.

The evaluation research, although attempted with an eye toward discretion, was another source of apprehension, even for experienced agents who were generally confident their endeavor would succeed.

The method of financing the program through voluntary contributions each year placed a particularly heavy burden on the township agents. They felt they had to produce quick, tangible results which farmers could see. In a sense, they considered the annual finance drive a dollars and cents evaluation of themselves and their programs.

Considerable time and energy of the township agents during the last year of the program was taken up with activities related to bringing off the vote in regard to whether or not to continue the program in the townships after the five-year experimental period. The agents found this a somewhat difficult and demoralizing task.

In his monthly report following the vote, one of the township agents summed up his feelings, "These closing months of the Township Extension Program are proving to be trying, discouraging and somewhat frustrating. It is becoming more and more difficult to suppress a feeling of failure and inadequacy as a certain end draws near only to be followed by an uncertain future both for the agent and folks worked with and learned to love, admire and respect. If ever there were a time in the career of this agent when he wanted to run away and hide, it is now."

The satisfactions—Even though the agents spoke frequently of stresses, they did derive personal satisfaction from the program. All of them enjoyed working with individual problems of farm families and the increased amounts of work in the field. The agents reported that they were particularly satisfied when they experienced success in recruiting new cooperation and when they established close association with farm families in their respective townships.

Balancing the stresses and satisfactions—Taking all factors into consideration, at the end of the experiment three of the township agents expressed willingness to continue in intensive on-the-farm extension work. One agent had mixed emotions: On the one hand, he found the work quite satisfying; on the other hand, he felt that the job was much harder and frequently more discouraging than county extension work, and he was not sure he could stand it on a continuing basis. Because of the various stresses on the agent, the fifth agent had no interest in continuing as a township agent beyond the experimental period. He was keenly aware of the demands that this program made and felt that he was physically not able to stand up under the strain. He expressed a preference for county extension work or some other kind of extension assignment.

Selection and Training of Agents for Intensive Educational Programs

On the terminal survey, farmers in the experimental samples were asked what qualifications they would look for in selecting an agent to do on-the-farm extension work. Their responses were summarized as follows:

	Percent of farmers
Personality; ability to meet and talk with people	56
Be well informed, technically competent	45
Have a college education or "good" education	21
Can understand and appreciate farmers	15
Have a farm background	12
Have ambition, aggressiveness, initiative	8
Be a good organizer	8

In responding to the question, many farmers apparently assumed that the person under consideration would be technically competent or have a college education and so did not mention these qualifications. Farmers especially stressed personality factors and the ability to meet and talk with people. A number also emphasized the ability to understand and appreciate farm people. One farmer commented, e.g., "The agent has to know what's inside the people—not just see the patches on their clothes."

Considering strong differences in types of agriculture, nationality groupings, and other factors in different parts of Michigan, leads to the conclusion that matching the agent's qualifications and interests with the area is particularly important in selecting agents for intensive on-the-farm extension work.

An important part of the background needed to do intensive extension work can be gained through formal schooling. Certainly the agent needs a solid background in the agricultural production fields related to the type of farming he will be working in. Training in farm management will be important regardless of the type of intensive program and will be especially essential in a management oriented program.

To deal with goals and attitudes more effectively—such as in attempting to determine farm families' goals or in helping them formulate realistic and challenging goals—extension personnel going into intensive work with farmers can effectively use training in psychology and sociology, and in the humanities and social sciences in general.

Part of the job of being an effective agent can be learned only through experience on the job, along with continued in-service training. The township agents were convinced that state specialists should spend more of their time training the field agents individually in the agents' offices and on farms, and in group meetings with 15 or 20 agents. Extension field agents can learn much from each other as was demonstrated in the quarterly meetings of the township agents.

The question is repeatedly raised as to whether or not it is possible to use new or inexperienced agents in an intensive on-the-farm program. Since all of the township agents were experienced extension agents, the experiment did not provide direct answers to this question. The township extension association boards of directors, and farmers in general, were completely convinced that experienced agents were essential for this type of work.

The township agent also expressed doubts whether a new and inexperienced agent would be successful in this type of work. One of the township agents commented, "The first thing that has to be done in starting a program such as this is to gain the confidence of the farmers. In county agent work, an agent can get by if he is right 80 percent of the time. On this job, he has got to be right 95 percent of the time. This means that you cannot put a green fellow right out of college on a job like this. *After* the agent has the confidence of the farmers, he can get by with telling them he doesn't know some of the time."

With the normal turnover of extension personnel and other positions to be filled, staffing on-the-farm agent positions without using new agents may frequently be a difficult task for extension administration. If agents could work together as teams in intensive work, the new agent could effectively handle much of the routine work at the beginning and could be learning from the more experienced agent.

At the end of the experimental period, farmers in the areas generally wanted assurance that they could keep the same agent if they were to continue the program. This is a fairly typical and apparently rather inevitable occurrence for effective agents, namely, the agent in a sense has to sell himself before he can work effectively with his clientele. But the ability to promote extension work on a continuing basis must rest partly on people relying on the Service as an institution and not entirely on the ability, integrity and personality of any one individual in the Service.

Conclusions Regarding Intensity

Many farm leaders feel that farmers need increasing amounts of educational and service help. Factors which are often mentioned as contributing to these needs are the increased complexity of technological, social and political information with which the farm manager must cope; the trend toward greater specialization; larger and more complexly organized farm units; marketing problems; higher capitalization; and increased managerial skill required to successfully operate farm units.

Some have pointed out the need for more technical services on the part of farmers, and farmers' apparent ability and willingness to pay for these services—such as soil testing and analysis, fertilizer recommendations, record keeping and accounting services, and spray schedules. A number of large growers pay substantial fees to commercial concerns for such services on a regular basis. Federal and state extension administrators are interested in determining the kind and amount of help extension should provide to farmers and in obtaining the necessary financial support.

Kind and Amount of Help Farmers Say They Want from Extension

On the terminal survey, farmers in all experimental and control samples were asked a series of questions to get their reactions on the kinds of help they thought farmers should be able to get from the Extension Service.

Farmers were asked, "In the future do you think extension should do more, less, or about the same amount of work with farmers as it has done in the past?" Farmers responded:

	Percent of farmers	
	Experimental	Control
More	61	44
About the same	33	43
Less	3	3
Don't know	3	10
Total	100	100

Asked "How large a geographic area should be assigned to an agricultural agent?" farmers responded:

	Percent of farmers	
	Experimental	Control
1 township	24	9
2 townships	29	5
3-4 townships	18	9
One-half county	8	16
1 county	8	21
Other	10	8
Don't know	3	32
Total	100	100

Farmers' responses to the question, "How many farmers do you think one agricultural agent can work with effectively?" were summarized:

	Percent of farmers	
	Experimental	Control
Less than 50	8	1
50-99	34	10
100-199	26	13
200 or more	11	14
Don't know	21	62
Total	100	100

Farmers in the experimental samples were asked how often they would like to have an extension agent visit their farms. Their responses were as follows:

	Percent of farmers
12 times a year or oftener	37
5-6 times a year	8
3-4 times a year	12
1-2 times a year	11
Other frequencies	4
Depends on circumstances; when called; when he has something new	28
Total	100

Responses to this set of questions indicated that in general, farmers would like to receive more help from extension than they had been provided (although a significant number felt otherwise), and also that those who had experience with the intensive program had greater enthusiasm for more extension help than those who had not. These responses on the survey are consistent with requests to the state extension office from county boards of supervisors and other local groups.

Late in the experiment the state extension director in Michigan reported that the state office had received 150 requests for additional field agents during an 18-month period. At least six areas specifically expressed interest in obtaining township agricultural agents.

In response to an open-ended question regarding the kinds of help they thought farmers should expect to receive from extension programs, farmers gave the following items as their main responses:

	Percent of Farmers	
	Experimental	Control
Soil and crop information	55	47
Livestock information	31	21
Information and help on everything pertaining to farming	31	28
Analysis of farm business	15	11
Latest research information; *new* information	14	9
Marketing information or help	13	2

Respondents also mentioned many other items, such as help on planning and construction of buildings, record keeping, social security and income tax, drainage and soil conservation, and household problems.

In regard to kinds of help farmers can use from extension programs, it may be quite significant that the township program evolved into a program with heavy emphasis on farm analysis and planning. It would seem that a program of any intensity even remotely approaching that of the township program could hardly be justified for getting information out to farmers—there are lower cost, more efficient methods of transmitting information.

Where farmers need repetitive service type help (such as help on income tax returns or soil testing) it would seem reasonable that they pay for such service, and that many of these services can and should be provided by commercial firms. It appears that one of the most useful and legitimate purposes of intensive extension programs is to do rather basic educational work—such as intensive training in a specialized area of interest to a group of farmers; short courses; or management oriented work with joint emphasis on helping farmers organize their farms, apply new information, solve important problems, and learn improved management techniques which they can continue to use on their own.

What is the Optimum Intensity?

Over the years extension has experimented formally and informally with different levels of intensity measured by the ratio of clientele assigned per agent. Still, relatively little is known of the nature of returns at different levels of extension input. The township experiment provided opportunity to study the results of an educational program which was much more intense than regular county extension programs in terms of farmer-to-agent ratio. The level of intensity was comparable to that in farm and home development programs and other intensive extension programs in which extension administrators are interested.

In regard to intensity, the township program would have been a more useful experiment if a wider range of intensities could have been included in the experiment—say two, three or four townships and up to 500 farmers or more. Such an experiment would necessitate holding a number of other factors constant (type of farming, management ability of farmers, type of program, method used, quality of agent) while experimenting with different intensities. Experimenting at different levels of intensity would be costly, but would provide information that would be especially useful in estimating the optimum level of intensity of extension education programs.

The township experiment does not provide information to determine optima but does provide comparisons of two levels of intensity, namely county and township. Intensive programs—such as township programs, farm and home development programs, and county staffs of subject matter specialists—are costly. Knowledge of benefits to be derived from such extension inputs are needed by Congress, state legislatures, county and township boards of supervisors, USDA personnel, university and extension administrators, and by groups of farmers who want to consider hiring an additional agent.

The principles of production economics are generally applicable to problems of resource allocation in extension—whether the problem is allocation among states or regions, among extension projects or programs, or among alternative approaches that may be used within programs. The principles are applicable for either maximizing extension output from given resources or minimizing cost for obtaining a specified objective.

Extension administrators have continuously groped with resource allocation problems, such as whether to start certain new projects, how much of the budget to allocate to different projects, and when to contract or terminate programs.

Economic principles probably do not come into use as often as they might in trying to solve the resouce allocation problems, partly because of the difficulty of assessing the output of extension and partly because many extension administrators do not think in economic terms. There are, of course, important administrative, political, institutional, social and personality factors which also must be considered in decisions on allocation of extension resources.

Benefit-cost analyses such as reported earlier in this bulletin, and some conducted in other states (1), give an indication of average returns in relation to average costs. Further experimentation and analyses would be desirable.

The benefit-cost analysis on the township program indicated that, conservatively, the benefits exceeded the costs by better than two to one. Precise comparisons of benefit-cost ratios of the intensive program with a county agricultural extension program are difficult because of problems of cost allocation and determining the clientele reached by county extension agents. As compared to the township agents, county extension agents usually work with larger numbers of farmers, but provide less help to each farmer.

A more extensive program, such as one agricultural agent per county, will almost surely give more return *per unit of input* on the average than a more intensive program. The point where the last unit of input was just paid for by the additional output or benefit had not yet been reached, in terms of increase in net farm earnings, in the township program. Institutional, political and other forces impose the restraints which keep the *economic* optimum intensity from being reached.

There is additional evidence that doing extension work on a township basis was too intense to be practical. One consequence of limiting the township agents' work to township areas with total numbers of commercial farmers of 100 to 175 was that the agents spent a great deal of time and energy trying to induce reluctant farmers to participate, and trying to make high participators out of lukewarm participators. The question must be raised as to whether this is the most effective use of agents' time. The cost of inducing some farmers to change may not be justified.

Other consequences of the agents' activities in the small geographic areas were tendencies on the part of several of the agents to devote a significant amount of time to service type activities, to repeat activities that shouldn't need frequent repeating, and doing things for farmers that they might better do for themselves. Further, after a period of time, an educational program in a township area will reach all the farmers who are willing to be reached. Then important policy questions must be raised regarding how long the extension service should work with the same group of people.

By the end of the third year of the experiment, several of the township agents expressed the belief that most townships in Michigan are too small to provide a productive work load for on-the-farm extension work. These reactions of agents and farmers while the experiment was in progress, as well as the spread of the Newton association over 11 townships in order to maintain a membership of about 50, may be taken as evidence that one township was too small an area. At the end of the experiment, the township agents generally agreed that one township was too small and restricted an area to provide a practical base for extension work.

There was general consensus among the township agents that an optimum work load for intensive on-the-farm extension work would be somewhere around 100 farm families or perhaps slightly more.

How large an area would have to be covered to obtain 100 active cooperators without undue "selling" efforts would depend upon such factors as concentration of farm people, their history of extension cooperation, and their enthusiasm for the program and agent. The area would vary markedly from north to south in Michigan because of the differences in concentration of farmers.

At the end of the experiment, the state extension director expressed faith in the intensive approach, particularly with a management orientation. He expressed the belief that one agent for each 500 farmers would be somewhere near optimum as far as extension accomplishment was concerned.

Deciding Whether or Not to Continue the Program

The proposal setting up the township program contained the following statement: "The effectiveness of extension agents is largely neutralized because of the work load assigned. The intent of the program is to demonstrate to farmers in a small political subdivision that increased productivity resulting from an intensive extension approach would be large enough to justify the support of such a program. It is believed that at the end of the five-year period, sufficient progress will have been made to motivate one of two courses of action: 1. the township will arrange the support of such a program, or 2. the farmers themselves will be willing to form an organization that will maintain such an intensive extension program."

About a year and a half before the experiment was to terminate, the state extension director informed the local township extension associations that they could continue the program beyond the experimental period under either of two alternatives: 1. secure financial support through township taxes, with the amount of local financial support specified for each area, or 2. if the associations wanted to continue with limited memberships with financial support through fees or voluntary contributions they could form a nonextension association, hire their own agent, and pay 100 percent of the cost. The other alternative, of course, was to discontinue the program.

To pave the way for the continuation of extension work in political subdivisions smaller than counties, the state extension administration and the farmer officers of the township extension associations encouraged the state legislature to pass the necessary legislation. An act authorizing townships and other political subdivisions to use monies for the support of extension work, if approved at a public referendum, was passed and signed by the Governor in April 1956.

In 1957 the state extension director developed a formula for determining how much financial support each of the five township areas would have to contribute if it wanted to continue the program after the five-year period. The formula was based primarily on the local area's ability to pay, and included consideration of assessed valuation, total population (which is the basis for state sales tax diversion in Michigan), farm population, and number of farms.

The financial contribution specified was $4,800 per year (approximately 60 percent of the estimated cost of conducting the program) in the Denmark and Odessa areas; $3,600 (50 percent of the cost) in the Almont and Newton areas; and $1,200 (30 percent of the cost) in the Tri-Township area. In addition, the local areas were expected to take care of local office expenses, secretarial help, travel, and maintenance; estimated at $2,500.

Decisions in the Townships

The area served by the Newton association had gradually expanded so that by the fifth year members were located in 11 townships in southwestern Calhoun County. The county extension director in the county reported that urban and rural nonfarm people outnumbered the farm people in each of the townships involved in the association. The Newton township extension association board, the township agent, and the county extension director all agreed that action to support township extension work from the tax rolls would not receive a favorable vote in any of the townships. So they recommended to the county board of supervisors that the township agent be kept on as an addition to the county extension staff at the end of the experiment.

The county board agreed to this proposal and provided the necessary financial support. The agent was given the title "county extension agent-livestock." The agent, in fact, continued about the same kind of program he had conducted as a township agent, with heavy emphasis on farm analysis and planning. While he covered the entire county in his work, he was available to and still used to a considerable extent by farmer members of the association. In this capacity, he helped a number of farmers follow through with changes in farm organization he had helped them plan while he was their township agent.

At the request of the township extension association board, the township boards in each of the three townships in the Tri-Township area agreed to put the township proposal to votes at special elections. Initially there was relatively little opposition to the program in any of the three townships. A restaurant operator campaigned against the proposal in one township where he was acquainted with many farmers; in that township the proposal carried by a narrow margin; in the other two townships the proposal passed with only a few dissenting votes. The township program continued in the Tri-Township area until the agent accepted another position one year after the termination of the experiment.

The proposal to authorize support of township extension work was brought to a vote in Denmark township at the primary election late in the experimental period. A similar proposal was voted upon at the same time in a township adjoining Denmark, the only case in Michigan in which a township not involved in the experiment held such a referendum. Local farmers and others reported to the researchers that the Denmark township board generally opposed the program. They also reported that prior to the vote the township treasurer told people that if the proposal passed their taxes would be raised $100 to $150, whereas the township extension association board estimated that an average of about $5 per voter would have provided the local financial support for the program.

Some other local citizens also campaigned against the proposal, whereas the Rotary Club in the largest town in the township urged people to vote in favor of the proposal. The vote was more than two to one against the proposal in both Denmark and the adjoining township.

A proposal to authorize support of township extension work was brought to a vote at a primary election in Almont township. Approximately one mill on the assessed valuation in the township would have been needed to provide the financial support. The township board was largely in favor of continuing the program and had quickly agreed to put the proposal on the ballot.

Prior to the vote, however, the township clerk circulated a petition asking that the township be divided and the area outside the village declared the extension area. In circulating the petition he emphasized that if the proposal went through it would mean higher taxes for everyone in the village with the benefit going primarily to the farm people. In a short time he obtained 200 signatures on the petition, and his subsequent resolution defining the extension area as excluding the village was passed by the township board.

This action stirred up considerable feeling among the farm people in the township, and some farmers talked of boycotting the village and doing all of their shopping elsewhere. The township extension association board asked for a hearing with the township board. They told the board they would rather see the township proposal defeated than have the rural area and the village divided, and asked for a reversal of the decision. This request was granted by the township board.

According to local people in Almont township contacted by the researchers, the township clerk continued to campaign against the program, especially among villagers with low or fixed incomes. The township extension association board conducted a campaign in favor of the program; a committee visited many people both in the village and in the country and contributions were obtained which were used to buy a full page ad in one paper and a half page ad in another paper. The ads carried the names of 91 people who were supporting the proposal, including a majority of the village council, a majority of the township board, farmers and village people. When the votes were all in and counted the results showed 226 against and 192 in favor of the proposal.

In Odessa township the proposal to authorize support of township extension work along with the necessary millage was voted on at a primary election. There was no organized campaign against the proposal, although there was strong general resistance to higher taxes. The proposal was defeated by five votes. The township board agreed to put the proposal on the ballot at the following general election, but a technicality regarding timing prevented this. The issue was brought to a vote again three months later. The township agent was asked to stay on in the township while the vote was pending. On the second vote the proposal was defeated by a very substantial margin.

Why Didn't the Program Continue?

One of the basic premises of the township experiment was the need to demonstrate the ability to increase the food supply through such an intensive educational program with farmers. This ability was clearly demonstrated as far as objective measures of changes in output were concerned.

The research on the township program indicated that significant benefits accrued to the farm people and the experimental townships by virtue of having the program. Considering only the increase in net farm earnings indicated benefits two to four times the cost of the program. In addition to the increase in earnings, the township program produced other benefits which are difficult or impossible to measure in dollars and cents terms (as is the case in any educational program). Examples of these changes are: 1. bringing about reorganization on some farms which permitted them to operate with less uncertainty; 2. promoting better appearing farmsteads; 3. helping farmers have more pride in themselves and their occupations; 4. working out more satisfactory lease, partnership and inheritance arrangements for farm families; 5. creating more business in the township areas; 6. developing farm leadership; 7. bring about better relationships within the community; 8. increasing the property and income tax base in the areas; and 9. with some people, creating increased respect for education.

Several of the township agents, county extension agents in the counties where the experimental areas were located, and farmers on the township association boards expressed the belief that five years was too short a time to do justice to such a program. Some specifically mentioned that 7 to 10 years were really needed. Given more time, the agents probably could have brought about higher participation and greater change on the part of some farmers in the areas.

It is true that some results attributable to the program probably accrued after the experiment concluded. Some of the money invested in capital improvements, soil fertility and the like had not yet paid off by the end of the experiment. In future extension research, it might be worth considering waiting with terminal measurements of outcome until effects of the program have had more chance to work themselves out after the experimental phases of the program are concluded. In the estimation of the program evaluator, however, five years was sufficient time to demonstrate the possibilities of such a program.

In the long-run, society's willingness to support a program depends upon whether the people and their representatives become convinced that economic and social objectives that can be obtained through the program are worth the cost, and also more worthwhile than alternative programs and expenditures. Thus the willingness of people to provide continuing financial support may be taken as a measure of the overall success of the township program. By this measure, the program was not a success.

Based on the research results of benefits and costs, assuming increase in net earnings as the only benefit and assuming no price depressing effects of expanded production that would come through such a program, farmers could well afford to support such intensive programs. An overwhelming majority of farmers in the experimental samples felt that the program was valuable both to the townships and to them personally. A number of businessmen in the townships said that business had never been so good.

A majority of the farmers in the experimental areas said they would be willing to pay $40 or more per year to have the program continued. Yet a vote to continue the program was obtained in only one area—and that in an area where only $1,200 direct financial support was requested. Further it appeared that the favorable vote was a vote of confidence in the particular agent, and the program stopped as soon as that agent moved to another job. The question must be asked as to how this apparent paradox came about.

A number of factors contributed to the negative votes in the three areas where this occurred. There were so many compounding and conflicting forces at work in the areas by the time the referendums were held that is was difficult to determine whether a vote cast was for or against the program, the agent, or a personality in the township who had worked for or against the program. Some useful observations on the outcome can be made, however.

One important reason for the negative votes was general opposition to higher taxes as time for the termination of the experiment approached—in the townships, in other areas of Michigan, in the state legislature, and elsewhere throughout the nation. People were generally tax conscious, and many were considering the alternative needs for tax monies, especially to support expanding school facilities. Some were rebelling against higher taxes. As one farmer put it on the terminal survey, "If anyone says 'tax' around here, be prepared to run!"

Following the unfavorable votes the Almont township agent wrote in his monthly report, "Fear of additional taxes was the primary reason for the 'no' vote. Few people were or are opposed to the program." The Odessa township agent expressed the belief that it was the tax issue which was most important, and whether the millage needed had been a half a mill or 10 mills was of little consequence. Some expressed willingness to support the program if it could be financed through some means other than public taxation.

On the terminal survey, respondents in the three experimental areas where the proposal lost were asked why they thought the vote to continue the program failed. Fifty-eight percent of the farmers in the Denmark sample, 50 percent of the Almont sample, and 39 percent of the Odessa sample said one of the main reasons was the cost of the program and the apparent necessity of increasing taxes to support it.

A second reason for the vote against continuing the program may have stemmed from the fact that the referendums were open to all qualified electors in the townships. Farmers in general are a minority group and are becoming increasingly so in general; more specifically nonfarm voters outnumbered farm voters in each of the three township experimental areas (by as much as three to one in the case of Denmark township).

The fact that farm people surrounding the towns and villages vote at the town and village precincts made it impossible to analyze the farm versus nonfarm voting patterns. It was apparent to some businessmen in the areas that the program had been good for their business and many of them likely voted for the proposals. Other town and village people may have voted for the proposals on the grounds that such a program could help make the community more prosperous and a better place to live. But beyond that, there is a real question as so why nonfarm people, especially retired people and those on fixed incomes, should vote for such a program. The program as conducted during the experimental period was almost entirely oriented toward providing help to commercial farmers; nonfarm people received little direct help through the program.

In efforts to promote favorable votes, some publicity indicated that if the program were continued the agents would be of more direct help to nonfarm people. This apparently did not impress the town and village people very much, and alienated a certain number of farmers who could see the possibility of a significant portion of the agents' time being diverted away from helping farmers. On the terminal survey 31 percent of the farmers in the Denmark sample, 50 percent in the Almont sample and 24 percent in the Odessa sample expressed the conviction that one of the reasons the vote to continue the program failed was that nonfarm people had voted against it.

In regard to the farm vote itself, there were some farmers who did not believe the program was worthwhile in any case. Others were not against the program but were not sure it was worth the cost. Some farmers probably have difficulty seeing the benefits gained through such an educational program (as compared to more specific products or services). Some of the farmers who had gotten considerable help from the program felt that they could do without a township agent for a while until they caught up on the changes they had planned. Only 28 percent of the Denmark sample, 14 percent of the Almont sample and 11 percent of the Odessa sample said that lack of acceptance by farmers was a reason for the unfavorable vote. A vote among the clientele the agents had worked with would undoubtedly have gone heavily in favor of continuing the program; a vote among all farm people would probably have carried.

The outcome of the votes indicated the effectiveness of well organized campaigns against a proposal, and by implication the counter-effectiveness of well organized campaigns in favor of a proposal. While there were enthusiastic farm supporters of the program in all of the areas, many farmers who apparently thought the program was worth continuing did not accept personal responsibility for helping see that the program was continued.

The township agents and their boards in the areas where the proposals lost reported that a number of farmers had failed to register and thus could not vote on the proposal, while others who had expressed willingness to support the proposal did not leave their farm work long enough to go to the polls to vote (some probably thought the proposals would pass or perhaps not pass, by a substantial margin regardless of their votes). Seven percent of the Almont sample and a rather significant 34 percent of the Odessa sample said that a reason the vote to continue the program failed was the lack of an adequate campaign to get out the vote.

In any case, the township program was rather unique in putting the continuation of such a program to popular vote. It is true that extension, and all public servants for that matter, should be responsive to the needs and desires of its clientele. But support for extension work on such an intensive basis would probably seldom receive a favorable vote of the general public—especially when a largely agricultural program is voted upon by both farm and nonfarm people.

Even the task of informing farm people of the costs and benefits of an intensive program is a large order. Responsible boards and legislators who have the time and inclination to study extension performance and proposals can be expected to support such programs under some circumstances. They will probably never receive consistent support through public referendums. The question might reasonably be raised as to the likely outcome if financial support of regular county extension programs, research projects of many kinds or a number of public services were submitted to popular vote.

No doubt in many people's minds, the votes in the townships to discontinue the program were taken as sufficient evidence that the program was a failure. The action taken by the Extension administration and the association boards in the townships to bring about favorable votes likely contributed to this image. While popular votes to continue the program would have been reassuring, the experiment did in fact show that intensive educational programs with farmers can bring about rapid adoption of new technology and increases in agricultural production.

Policy Implications of Intensive Extension Programs

A number of policy questions are implied in the consideration of intensive on-the-farm extension programs such as the township program.

One such question relates to the welfare considerations involved in the redistribution of income. The redistribution can come about through decisions on what areas or groups of farmers should receive the intensive help, and through decisions on how much of the financing should be supported by taxation, including taxing of nonfarm people. Redistribution can also occur within the area or group.

For example, a number of farmers, especially in the Denmark and Almont areas, felt more or less keenly that they were in competition with each other. As a result, some farmers thought the township program was a good thing because it sharpened competition among farmers and made them work harder.

Others simply wanted to keep up with the crowd but were content with that, or were older or otherwise less able to compete. Farmers in these categories felt badly because they either fell behind or else had to work harder than they wanted to in order to keep up.

Some who were (or who considered themselves) the leading farmers felt badly that the township agent helped other farmers catch up with them and thus displaced them from their position of eminence.

A specific example: some farmers in Almont township who had previously produced the highest-yielding corn resented the fact that due to the corn contest, many farmers were producing 100-bushel corn. To the extent that some farmers experienced increased earnings and other benefits through the program, other farmers were made worse off, at least in a relative sense.

To the extent that programs such as the township program increase agricultural output, the increased production may come through technological changes utilizing inputs as previously used, by increasing inputs, or both. The township program had both effects, but certainly including substantial increases in the use of inputs originating off the farm. In times when surpluses are a problem in U. S. agriculture, the question can be raised as to whether this transfer of resources is a desirable social objective.

So long as intensive programs operate in only a few scattered areas, they have little impact on market prices. From the standpoint of individual farmers, many are operating under conditions in which increases in output on their particular farms will contribute to higher net farm incomes. But if an extension program which had as much impact on agricultural output as the township program were expanded, the effect on farm prices, farm incomes, and the agricultural surplus problem would have to be seriously considered.

Various studies indicate that the aggregate elasticity of demand for agricultural products is low, both with respect to price and income. The low price elasticity of demand for farm products means that even a small surplus sharply depresses farm prices, and farmers earn less net income from producing larger output. Starting from a position of balance between production and disappearance, Brandow estimates that an 8 percent increase in production requires a price decline of 24 percent to clear the market under free market conditions (4). While such imbalances existed in U. S. agriculture during the 1950's and early 1960's, farm surplus disposal programs prevented such drastic declines.

Looking ahead, it appears that the main domestic source of increase in demand for agricultural production is the prospective increase in population. While large scale permanent programs of providing food to lower income people might add to domestic demand, most students of the subject can see relatively little increase in total demand coming about through increased per capita consumption.

Many students of agricultural policy believe that organizational and technological changes on hand or in prospect will result in sufficient increases in agricultural output to meet demands from domestic population increases for at least 15 to 25 years ahead. So programs like the township program do not appear to be needed to meet the domestic needs of a peacetime nation.

With continuing hostilities around the world, however, programs to bring about rapid increases in farm output may be called for at any time to meet defense needs. And with prospective world population increases, the techniques developed and tested in the township experiment may be put to use in the U. S. and elsewhere to help meet critical food needs.

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APPENDIX TABLE 1—Changes in farm practice adoption scores, 1953 to 1958: experimental and control samples.

	Newton			Tri-Township			Denmark			Almont			Odessa			Total		
Adoption Score	1953	1958	Change	1953	1958	Change	1953	1958	Change	1953	1958	Change	1953	1958	Change	1953	1958	Change
Soil management and fertilization practices:																		
Experimental samples	29	47	+18	32	35	+ 3	35	59	+24	28	46	+18	21	37	+16	29	46	+17
Control samples	31	37	+ 6	34	30	− 4	26	42	+16	31	39	+ 8	24	28	+ 4	29	36	+ 7
Crop culture practices:																		
Experimental samples	41	69	+28	38	65	+27	a	62	a	37	67	+30	37	65	+28	38	67	+29
Control samples	44	64	+20	32	50	+18	38	55	+17	38	53	+15	41	58	+17	39	56	+17
Corn practices:																		
Experimental samples	28	51	+23	34	49	+15	a	63	a	29	60	+31	22	48	+26	27	52	+25
Control samples	30	43	+13	24	32	+ 8	25	49	+24	34	44	+10	25	38	+13	28	41	+13
Dairy practices:																		
Experimental samples	61	72	+11	54	57	+ 3	b	b	b	63	68	+ 5	51	57	+ 6	58	64	+ 6
Control samples	58	57	− 1	35	41	+ 6	b	b	b	60	68	+ 8	47	51	+ 4	49	55	+ 6
Hog practices:																		
Experimental samples	61	74	+13	b	b	b	a	a	a	47	64	+17	52	64	+12	54	67	+13
Control samples	56	69	+13	b	b	b	45	56	+11	b	b	b	57	75	+18	54	69	+15
New farm practices																		
Experimental samples	–	45	+45	–	37	+37	–	64	+64	–	47	+47	–	35	+35	–	46	+46
Control samples	–	37	+37	–	25	+25	–	52	+52	–	31	+31	–	32	+32	–	36	+36
Total farm practices																		
Experimental samples	47	65	+18	39	49	+10	36	61	+25	50	63	+13	39	54	+15	42	59	+17
Control samples	43	52	+ 9	35	39	+ 4	32	48	+16	47	56	+ 9	40	47	+ 7	40	49	+ 9

(a) Data not available.

(b) Applied to too few cases to compute average.

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